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NO. 37

LAKE CARRIERS ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

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CHART OF THE SKY.

An international congress met in Paris in 1887 and resolved to make a photographic chart of the whole sky.

The work was begun in 1891, and, as it is expected to occupy about ten years, it will form a fitting close to a century which has been so rich in astronomical discoveries. Eighteen observatories scattered over the world are taking part in the work. Similar instruments and plates of exactly the same size—four square degrees—will be used. Each photograph is to be duplicated to prevent mistakes, and also there are to be two series of exposures, so that some 44,000 photographs in all will be taken. A short exposure series will form a catalogue of about 1,500,000 stars down to the seventh magnitude, while the other series will be exposed forty minutes, and will form a chart containing about 22,000,000 stars down to the fourteenth magnitude. The entire map of the sky, when finished, will cover a globe seven and a half yards in diameter. In two or three generations astronomers, by comparing this chart with their own observations, will know much more than we do about the relations and relative motions of the suns and systems of space, and whither our own little solar system is bound and with what velocity.

LARGE RUDDER PLATE FOR ONE OF THE NEW AMERICAN LINERS.

The largest steel plate ever rolled, not only in this country, but in the world, was turned out a few days ago by the Wellman Iron and Steel Works, Chester, Pa. The dimensions of the plate are 450 inches long, by 130 inches wide and 1 1/4 inches thick. It is intended as a rudder plate for one of the new "ocean greyhounds" contracted for by the International Navigation Co., with the Messrs. Cramp, the Philadelphia shipbuilders.

The rudder plates were so large that months of inquiry developed the fact that there were but two mills having the capacity to make them and assume the risk. One of these was the famous Krupp establishment at Essen, Germany, and the other that of the Wellman Co., at Chester. The huge ingot, weighing 21,000 pounds, was placed in the heating furnace on Wednesday and remained there all night and part of Thursday last, when it was removed to the table and successfully rolled.

POWER LOST THROUGH FRICTION.

The remarkable statement is made, on competent engineering authority, that the average amount of friction or power lost by overcoming friction in machinery and mill work is 50 per cent. of the gross power, the loss occurring at the lubricated surfaces. This statement is represented to be based upon the fact that power demanded to drive the machinery in such an establishment has been found by competent examiners to be variable to the extent of 15 or 20 per cent. by change of temperature from heat to cold, as from summer to winter. Friction has been reduced 50 per cent. by changing lubricants. Again, the friction of shafting is known to vary with size, length and load from .33 to 1.5 horse power for each 100 feet in length, the main shaft averaging about 1 horse power; the losses of power in mills

ranges with different machines from 5 to 50 per cent., averaging for cotton and flax about 60 per cent., with good management, and in woolen mills about 40 per cent. The loss of the steam engine is found to range from four pounds per square inch on engines of 25 to 50 horse-power down to one pound on very large engines. In factories, where the machines are many and small, the friction is about 75 per cent; on large machine tools it is about 15 per cent., this loss of power being exhibited where machinery is well planned and erected

A MOVING MASS OF LAND.

Geologists and civil engineers sent out to make a survey by the railroad company interested, report that a traveling mountain is found at the Cascades of the Columbia. It is a triple-peaked mass of dark brown basalt, 6 or 8 miles in length where it fronts the river, and rises to the height of almost 2,000 feet above the water. That it is in motion is the last thought that would be likely to suggest itself to the mind of any one passing it, yet it is a well-established fact that this entire mountain is moving slowly but steadily down to the river, as if it had a deliberate purpose some time in the future to dam the Columbia and form a great lake from the Cascades to the Dalles.

In its forward and downward movement the forest along the base of the ridge has become submerged in the river. Large tree stumps can be seen standing dead in the water on this shore. The railway engineers and brakemen find that the line of railway that skirts the foot of the mountain is being continually forced out of place. At certain points the permanent way and rails have been pushed eight or ten feet out of line in a few years, and it is now certain that the road will eventually be destroyed, necessitating some other route to pass the range.

Geologists attribute this strange phenomenon to the fact that the basalt, which constitutes the bulk of the mountain, rests on a substratum of conglomerate or of soft sandstone, which the deep, swift current of the mighty river is constantly wearing away, or that this softer subrock is of itself yielding at great depths to the enormous weight of the harder mineral above.

ANCIENT LIGHT-HOUSES.

The oldest light-houses or towers known were built by the Libyans in lower Egypt. They were temples also, and the light-keeper priests taught pilotage, hydrography and navigation. The famous tower on the Isle of Pharos, at Alexandria, built about 285 B. C., is the first light-house of undoubted record. This tower, constructed by Sostratus, the architect, was square in plan, of great height, and built in offsets. An open brazier at the top of the tower contained the fuel for the light. At Dover and Boulogne, on either side of the English Channel, were ancient light-houses, built by the Romans. But the light-house at Corunna, Spain, built in the reign of Trajan, and reconstructed in 1634, is believed to be the oldest existing light-house.

NEWS AROUND THE LAKES.

CHICAGO, ILL.

Special Correspondence to The Marine Record.

A survey was held on the steamer M. T. Greene Monday by J. B. Bates and Capt. F. B. Herriman.

A survey was held on the steam canal boat Imperial Tuesday by F. D. Herriman, J. B. Bates and P. Puliot.

We are sorry to know that Capt. J. C. Perrett, who has been with the Marinette Barge Line Co. for many years, is suffering from a severe illness from which it is feared he will not recover. Later: Capt. Perrett died on Wednesday.

The Marinette Barge Line steamer J. C. Perrett, Capt. Thos. Chron, was put in commission for the first time this season on Monday, and left for Duluth with the barges Mike Corry, Kate Darley and A. T. Judd to load lumber for this port.

Capt. Ed. Van Dalsen, referee of the tug lines at this port, has resigned in consequence of some of the tugs having broken through the rules agreed upon at the opening of the season, the consequence of which is that all the companies' tugs are again running down Lake Michigan after tows.

At Miller Brothers' shipyard the steamer Florida is in dock for a new fore foot and for ironing, 15 new planks on bottom and considerable calking; the steamer M. T. Greene for 20 new planks on bottom, new stern bearing and calking; the tug Alert received a new wheel and repair to rudder; the steam canal boat Imperial is in dock for a survey and repairs.

The new steamer Adella Shores, Capt. J. J. Carr, arrived on her first visit to this port Monday afternoon, light, from South Chicago, where she had unloaded 900,000 feet of lumber. She went to the O. S. Richardson Fueling Co.'s Market Street dock to coal up. The steamer is owned by the Shores Lumber Co., Ashland. Her dimensions are 212 feet over all, 37 feet beam, 12 feet hold. She is a trim looking craft.

Capt. James L. Dunham received a telegram Monday morning that his schooner James G. Blaine had been released and would be in Manitowoc that day. On the arrival of the schooner at Manitowoc it was found that she could not go into Burger's dry dock for several days in consequence of the Robert Holland having forestalled her, and the Blaine was ordered to go to Milwaukee for repairs.

Capt. Frank Fountain, the newly appointed keeper of Chicago Harbor life saving station, is doing his best to have a crew appointed at once. All applicants have to pass a rigid medical examination, and the majority of those examined have not passed. William St. Peter, Thos. B. Nelson and Simon Lemoraux, who have been in the service before, and Ben Larsen have passed, and four others will be found as soon as possible.

Last Thursday morning the steamer Wyoming backed into the steam canal boat Imperial, light, laying at the O. L. Richardson Co.'s coal dock Illinois Central Slip C, striking her amidships and crushing in her side caused her to sink. The Imperial was towed by the Dunham Towing & Wrecking Co.'s tugs along the bottom of the river to Miller Brothers' shipyard, where she had to be pumped out before she could be docked, when it was discovered that one wheel was broken, both shafts bent and the stern bearing broken by the dragging she had undergone.

The schooner Gracie M. Filer, with hemlock plank from Pine Lake for Chicago, is ashore in the bay four miles south of Grand Traverse Light. She is on a rocky bottom, is out six inches amidships and is nearly full of water.

WILLIAMS.

BUFFALO, N. Y.

Special Correspondence to The Marine Record.

The steamer Emily P. Weed will be out of the dry dock in a few days, five or six plates had to be removed, besides considerable calking.

Since Capt. Galvin was appointed to the office of supervising inspector of the ship-brokerage firm of Galvin, Clark & Co., has been changed to A. Clark & Co., the members being Capt. Alexander Clark and John C. Fitzpatrick.

The hull of the new fireboat building for the Cleveland fire department at the yards of the Union Dry Dock Co., will be launched about Sept. 15th, according to

present arrangements. The name of the craft will not be divulged until the day of the launch.

Capt. Killoran, superintendent of the Northern Steamship Co. has been appointed the Buffalo representative of the Bureau Veritas, a classification society which is now rating quite a number of high classed lake steamers.

The United States light-house tender Haze, Capt. John Baxter, is again in port after a trip of inspection around the Lake Erie aids to navigation and up the Detroit River. The light-house system is reported to be in first class condition. The question of electric buoys is receiving the attention of the department.

E. J. Henry, who has been the agent of the Lehigh Valley Transportation Co., at Chicago, for two years, has been appointed Western freight agent of the Lehigh Valley Railroad, next to New York the most important agency on that system. He will continue to act as agent of the steamer line also. He succeeds William S. Spiers, resigned.

Supt. Chapman, of the life saving station stationed at this port, has just received instructions from Washington to provide a crew of seven men for the new life saving station at Ashtabula, O. Immediately on receipt of the communication Capt. Chapman telegraphed Capt. Wadsworth, of the new station, authorizing him to make the necessary provision. The station has just been completed and is fully equipped for lake service.

The steamer Fred Pabst grounded on Seneca shoal, near the south shore. She went on Tuesday night and ebbed two feet forward, having slid upon the flat rock about one-third her length. Tugs were sent from here to release her, but soon after they arrived the water lowered rapidly, and she is being lightened of her cargo of wheat from Chicago. The steamer Seneca grounded there last year and it cost her owners \$15,000 to make repairs.

In noting the change of partnership in the well known firm of Galvin, Clark & Boland, vessel and insurance agents, it may be stated that the firm of Galvin, Clark & Boland, dissolved partnership, June 9th, 1894, same day Mr. John C. Fitzpatrick joined Capt. M. J. Galvin and Alex. Clark, firm name being Galvin, Clark & Co. September 1st, 1894, Capt. Galvin withdrew to accept the office of U. S. Supervising Inspector of Steam Vessels. Capt. Alex. Clark and Mr. John C. Fitzpatrick now comprise the firm, name of same being A. Clark & Co.

United States Supervising Inspector M. J. Galvin, has investigated the collision cast between the excursion steamers Riverside and Silver Spray. Complaint was made to Collector of Customs P. C. Doyle by several of the passengers who were on the Silver Spray at the time when the two boats came together on Niagara River, August 23. Several witnesses gave their testimony, and they all seemed to be of the opinion that there was a race and that the Riverside forced the Silver Spray out of her course. Capt. Lannigan of the Riverside, however, denies that there was a race. He and Capt. Lautz of the Silver Spray will give their side of the story later, at this time however it is considered that the matter will be thoroughly investigated.

DETROIT, MICH.

T. F. Dwyer, submarine diver, succeeded in getting all the tools that were lost when the pile driver in use at Oades' shipyard capsized.

The Grummond Line tug Crusader, with a full wrecking outfit is now stationed at the Sault, where she will be kept for the balance of the season.

The schooner Amboy, bound up in tow of the steamer Veronica, collided with the barges Sweepstakes and Corisande, bound down in tow of the tug Thompson, in the dense fog on Monday morning. The boats were abreast of Belle Isle. The Amboy struck the Sweepstakes on the port bow, damaging her badly. The Corisande was unable to stop and was also run into by the Amboy. The Corisande received considerable damage. The Amboy's port bow was cut down two feet below the waterline and she was run ashore to prevent her sinking. She will be dry docked here.

The sail yacht Josephine, with a party of passengers from this port with the intention of reaching Toledo, was caught in Saturday's storm about five miles in the lake off Stony Point and barely escaped being swamped. The crew spent the night wind bound at Monroe and expressed themselves very grateful that they were still

living. They said the storm came on them suddenly and was one of the worst they had ever encountered, as well it might be for novices or amateurs, but it amounted to very little more than a squall when aboard ordinary tonnage.

In the race on Saturday between the steam launches Dawn and I. C. U., the former walked clean away from the much vaunted speed destroyer. The official survey of the distance covered by the steamyachts gives it as 14½ miles, over which the Dawn made the run in 48 minutes. This would give the Dawn a speed of nearly 19 miles an hour. The Dawn is of Herreschoff build and the I. C. U. was produced by local talent. There is talk of another spin to even up the honors, as it is thought that the I. C. U. was not at her best during the race.

After demonstrating her ability to run about twenty miled an hour the Unique had to be taken in hand this week by the Frontier Iron Works for some minor repairs to her machinery. She is a staunch, well built craft, not too elaborately fitted for the passenger trade, but will certainly do all over twenty miles an hour when she gets running smooth. Her Ward water tube boilers are great steam raisers and her engines, built by the Frontier Iron Works, are splendidly finished and beyond criticism, so that there is nothing to stop her getting over the ground.

CLEVELAND, O.

Capt. Henry Brock has been appointed master of the steamer E. B. Hale.

The steel steamer Manola docked at the Cleveland Dry Dock this week for bottom repairs.

A. A. Parker, of the firm of Parker & Millen, Detroit, visited this port Tuesday on vessel business.

The Bradley Line schooner Ahira Cobb is being rebuilt at Capt. Davidson's yard in Bay City.

The steamer Germanic and the schooner Emma C. Hutchinson docked in the Ship Owners' Dry Dock this week.

Mr. C. H. Keep, secretary of the Lake Carriers' Association, has returned from his trip to Europe. He visited this port on Monday.

Mr. Luther Allen, secretary and treasurer of the Globe Iron Works Co. returned home on Saturday after an absence of several weeks on the Pacific coast.

The fifty-cent coal rate held out for by Cleveland vessel owners and brokers to Lake Superior is now being paid, although shippers made a stubborn fight for more than two weeks.

Capt. Thos. Wilson and Harvey H. Goulder Esq. returned from their fishing tour on the north shore of Lake Superior on Monday last much improved after their enjoyable outing.

The yacht Liberty H. Ware, with Capt. John W. Moore, Judge Ware and party, returned from Marquette on Thursday last. The party were absent about a month, and report a very pleasant outing on Lake Superior.

The steamer Maryland, built by the Detroit Dry Dock Co., and hailing from Milwaukee, cleared from this port on Tuesday with 3,400 tons of coal and fuel. The entire work took only two and a half days under the direction of Col. Silas Clark.

Complaints are heard about the detention experienced at the "Soo" Canal through an enormous increase of traffic which has developed during the past few days. Some vessels, it is reported, have been detained from fifteen to twenty-four hours.

MANISTEE, MICH.

Special Correspondence to The Marine Record.

The schooner Lotus, Capt. Robert Seator, with lumber for Chicago, was in here Saturday windbound and leaking.

Capt. Cyrus Sinclair was here looking after the interests of the underwriters who held insurance on the Robert Holland.

Capt. William Keith and H. C. Albrecht held a survey on the Robert Holland, Saturday, and assessed the damage at \$2,000.

Capt. John Jenks, formerly of the steambarge White and Traint, was here on behalf of Bigelow Brothers, Chicago, owners of the Holland.

The steamer C. J. Kershaw and consorts Ironton and Moonlight, the steamer D. M. Wilson and consort Manitowoc, and the schooners H. W. Sage and Nelson Bloom were here last week with coal cargoes.

There was a large muster of old-time lake captains here last Friday and Saturday, amongst them being Capts. W. S. Mack, M. Swain, Cyrus Sinclair, William Keith, H. C. Albrecht, J. Jenks, C. Moore, J. Mulvaney, Robert Seator, John M. Laughlin, J. P. Harrow, and L. E. Hollister.

The wrecking steamer Favorite, Capt. M. Swain, arrived here early Friday morning with the steambarge Robert Holland and consorts Fanny Neil and S. M. Stephenson, which had been released from Big Bear Point. The Holland was leaking badly and had a steam pump on board. She was put in A. B. & G. B. Burger's dry dock for a survey and repairs. She had received a heavy blow on the port quarter, which cut through her wale strake and timbers and broke several stanchions and badly twisted her stern, from the Stephenson which collided with her when they went ashore.

At H. B. & G. B. Burger's shipyard the steambarge Robert Holland is in dock for repairs to stem, and calking, the Fanny Neil received new timber heads and tow posts, some repairs to hull and calking; the steamer C. J. Kershaw received part new stern, bow ironing, and some calking; the tug Albert J. Wright is having her boiler taken out and replaced by the boiler saved from the wreck of the steamer Calumet; the passenger steamer Liberty is on the boxes for repairs to machinery, a new crank shaft, and a new Trout wheel; she is also receiving an electric light plant and a powerful search light; the steamer Glad Tidings was on the boxes for a new wheel and bottom calking; the scow Felicitous and schooners Alice B. Norris and S. B. Pomery had been in dock for bottom calking, the steamer Specular to have a leak stopped, the steamer Menominee for fixing brasses, the steamer Sheboygan had her smoke stack repaired, the schooner A. C. Sprague received a new foremast.

The schooner James G. Blaine is expected here to go into the Burger & Burger dry dock. WILLIAMS.

A SOLITARY ATLANTIC CRUISE.

The wife of Capt. Adolph Frietsch, the intrepid Swede, hailing from Milwaukee, Wis., has received a letter from her husband, written on the Atlantic ocean August 24, in latitude 47 degrees north and longitude 37 degrees west. The letter was brought to New York by the steamer Menontis. This letter, postmarked August 24, was handed from the little schooner Nina to the captain of the steamer on August 20. Capt. Frietsch had neglected to wind his chronometer and was lost as to the time, but the chronometer was corrected by the captain of the Menontis. The letter was posted in New York on September 3. Mrs. Frietsch and her four children live in Milwaukee, and she says:

"I have no fear that my husband will be lost, he is too good a sailor for that. His mother is not living in Milwaukee, but in Finland, where he was born. He has been in America twelve years. My husband will not exhibit himself and his boat for money, I don't think, if he gets across safely. He wants to get his name up, and get a vessel to sail. I don't know yet whether we shall go across the Atlantic this winter, but we shall probably do so if everything turns out all right."

The letter describing the Milwaukeean's experience is as follows:

"As I am now over half ways across the ocean, I will write a few lines, in order that I may be prepared if I should meet a westward bound steamer. I have now been nineteen days upon the voyage and up to this time have had good health. On the 14th of August I had to go through a heavy storm, which broke the rudder, but as soon as the sea was calm again I let myself over the boat's side and repaired it as well as I could. I bored a hole in the under edge of the rudder under the water and fastened the ropes on the deck, one on each side of the boat.

"Since then I have governed the boat in this manner and have left over a thousand miles behind me. Therefore there is no more danger from this source. I have had in the meantime, also, uncomfortable weather and high seas, but no more such heavy storms as on the 14th of the month.

"Most of the time I have had strong winds to deal with, so that I have had continually to attend to the sails and to reef them. And with the cooking, sleeping, directing of the boat, the nautical calculations and the like the time has flown by.

"On an average I meet a ship every five days, though I hope to meet ships more frequently when I get into more northerly waters. Five days after my departure I forgot to wind my chronometer and since then I have been in constant uncertainty about my reckoning. I

am in hopes during the next few days of meeting a steamer which can set me right.

"In the hope soon to be able to communicate further with you from Queenstown.

ADOLPH FRIETSCH.

Capt. Frietsch started from New York on August 5, and if he makes as good progress in the last half of his journey as in the first he must now be nearing Queenstown. The Nina leaked when she sailed out of New York harbor, and on August 28 the steamer Scandia sighted a small wreck which was thought to be the Nina; and so reported at New York. The point where Capt. Frietsch met the Menontis is more than 1000 miles east of the place where the wreckage reported by the Scandia was seen.

NOTICE TO MARINERS.

Notice is hereby given that the Poverty Island shoal 2d class nun buoy has gone adrift. The buoy will be replaced at an early date.

COMMANDER J. H. DAYTON, U. S. N.,
Inspector 9th Light-House District.

MAINTAINING DISCIPLINE.

Commissioner Bloodgood rendered an interesting decision at Milwaukee a few days ago in the case of Capt. Stein, of the steamer Virginia, who was charged with assaulting a seaman. The commissioner discharged Capt. Stein on the ground that he had the right to compel obedience by any means within his power, and in his decision the commissioner held that in an emergency even the passengers could be compelled to obey the mandates of the captain. Capt. Stein was arrested two weeks ago. The trouble grew out of the refusal of some men to shovel some ashes from the deck as they had been commanded to. When one of the men, acting as spokesman for the others, informed the captain that they refused to do his bidding, he promptly knocked him down, and when the man had him arrested for the act he maintained that the proceeding was necessary to prevent mutiny.

AMPLITUDES.

The following approximate amplitudes of the Sun's rising will be given each week in this column during the season of navigation: A second bearing of the Sun may be taken at sunset by reversing the bearings to read west instead of east, as, for example, E. by N. $\frac{1}{2}$ N. for a sunrise bearing would read W. by N. $\frac{1}{2}$ N. for a sunset, or E. 4° N. to W. 4° N.

LAKE ERIE AND S. END LAKE MICHIGAN LAT. 42° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Sept. 15.....	E. 4° N.	E. $\frac{3}{8}$ N.
Sept. 20.....	E. 1° N.	E. $\frac{1}{8}$ N.

LAKE ONTARIO, S. END HURON AND CENTER LAKE MICHIGAN LAT. 44° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Sept. 15.....	E. 4° N.	E. $\frac{3}{8}$ N.
Sept. 20.....	E. 1° N.	E. $\frac{1}{8}$ N.

N. END LAKES HURON AND MICHIGAN, LAT. 46° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Sept. 15.....	E. 4° N.	E. $\frac{3}{8}$ N.
Sept. 20.....	E. 1° N.	E. $\frac{1}{8}$ N.

LAKE SUPERIOR LAT. 48° N.

Sunrise.	Bearing (degrees.)	Bearing (points.)
Sept. 15.....	E. 4° N.	E. $\frac{3}{8}$ N.
Sept. 20.....	E. 1° N.	E. $\frac{1}{8}$ N.

With a compass correct magnetic, the difference between the observed and true bearings will be the variation for the locality. If there is any deviation on the course the vessel is heading at the time of taking the bearing the result after the variation is applied will be the amount of deviation on that course.

MANAGER LAKE DEPARTMENT OF THE AMERICAN LLOYDS.

Mr. Robert Logan, Western Reserve Building, Cleveland, O., has been appointed manager of the lake department of the American Lloyds Register, a classification published by the American Shipmasters Association, New York, who also issue, "The Record of American and Foreign Shipping."

Mr. Logan in succeeding Capt. Wm. W. Bates, brings considerable talent to bear in his recent appointment and will no doubt soon have this well known classification society in much greater favor on the lakes, than it has been hitherto. In addition to the management of

the lake department of the American Lloyds, Mr. Logan is consulting engineer for the Cleveland-Cliffs Line, expert, surveyor and inspector for the Northern Steamship Line and connected as a naval architect and consulting engineer, with important shipping interests on this side as well as in Canada.

Mr. Logan designed and superintended the construction of the Canadian revenue cutters Constance, Curlew and Petrel at Owen Sound. Also the large steamer Manitoba, and his counsel is generally regarded as being especially valuable in professional work.

ITEMS FROM THE LOG BOOK.

The Chicago towing companies, which have peacefully worked together since last fall, have declared war, and rates are going to smash.

The tug Seymour and yacht Mina, with thirty-five men, are picking up pulp wood scattered over the Straits of Mackinac and shores, which went adrift last fall.

The Sault Ste. Marie interests are now agitating that the width of the new Hay Lake Channel be increased from 200 to 600 feet in width. When the present dimensions were fixed an allowance was made for its ultimate enlargement.

The old passenger steamer Chief Justice Waite, of Chicago, has again changed hands, having been sold by W. A. Paulson and others to Jackson & Murray, a real estate firm, who give in exchange suburban lots near La Grange.

The Anchor and Lackawanna lines at Chicago gives notice that, beginning on October 1st, the wages of 'long-shoremen will be raised from 20 to 25 cents an hour. These two lines did not go into the Connor-contract system last spring, but have hired their own men. The advance has been made voluntarily by the lines.

The "round the world" schooner, George L. Wrenn, is in worse straits than ever. She has just been libeled by the tug Sport, of Ludington, for a wrecking bill. While men were trying to put her in dry dock Friday she filled with water, and a tug occupied the entire day in pumping her out.

The London and Port Stanley route on Lake Erie has proven such a good one this year that the owners of the Erie & Huron railway and the lessees of the London & Port Stanley railroad, in connection with which the steamer Lakeside has been operated on the route this year, announce their intention of putting an additional boat on next year and giving a daily service.

The Smith-Boutell tugs which have towed millions of feet of logs from the Georgian Bay and Lake Superior districts into the Saginaw river this season are now bound down with their last rafts. The Traveller and Ella Smith have left Lake Superior with big rafts and the Winslow, Charlton, Niagara and Sweepstakes are all at different points between West Bay City and Georgian Bay with rafts. All the boats are on their last trip this week. The Michigan Log Towing Co. has towed across 60,000,000 feet since July 1.

The steamer Manitou was compelled twice recently to abandon the trip between Mackinac Island and Sault Ste Marie. The Lake Michigan & Lake Superior Transportation Co., of Chicago, has had much to contend with the last few weeks in the way of dense smoke and fog on the lakes and it was only by extra vigilance and risks on the part of the masters of its steamers that any reasonable schedule time could be made. The company is disappointed in not being able to carry out its season's program as far as the run to Sault Ste Marie by the steamer Manitou is concerned.

The project of raising sunken wrecks with air bags will be tested on the tug Lucille, which was crushed by the ice near the Lakeview crib at Chicago, in February, 1893. The American Salvage & Wrecking Co., under which title the Grant brothers and Thomas Cavanaugh, of Tacoma, Wash., have incorporated their firm, have their appliances on board a tug and Mr. Cavanaugh is confident that he can raise a large number of wrecks which have been abandoned on the lakes, and that there is a great deal of profit in the business. The Lucille is but a practical test of what the wrecking company claims to be able to do. The steamer Smith Moore, sunk in Munising harbor, Lake Superior, may be the next boat on which the experiment will be made. The project is the old new one and the system is to sink air bags empty into the holds of vessels and then pump them out.

MARITIME LAW.

AMERICAN STEEL BARGE CO v. STEAM TUG BATTLER.

U. S. District Court, Southern District of New York.

TUGS AND TOWS—WEATHER ON STARTING—FOG—STRANDING—USAGES OF TIME AND PLACE. A tug with a tow started to leave the mouth of the Kennebec river, during a temporary lightening up of the prevailing fog, and, that fog shutting down again before the tow had reached the sea, and the pilot of the tug having been deceived as to his position by misleading signals from an anchored vessel, and the current being changeable and not to be counted on, the tow was carried out of its course and stranded. In a suit to recover the damage, the evidence indicated that by the usages of the time and place the start of the tug was under the circumstances justifiable and reasonably prudent, and as, after her start, the immediate causes of the collision were the variable currents and the misleading signals of the anchored vessel, which was not a party to the suit, no fault could be found with the navigation of the tug. Held, therefore, that the libel against her should be dismissed.

MORRIS BEEF CO., LT., v. THE WELLS CITY.

Circuit Court of Appeals, Second Circuit. May 29, 1894.

SHIPPING—CARRIAGE OF GOODS—LIABILITY FOR DELAY. A clause in a bill of lading, giving the ship liberty "to tow and assist vessels in all situations," authorizes her, if in the ordinary course of her voyage she falls in with another vessel in distress, to go to her assistance and tow her to such place of safety as, under the particular circumstances of the case, is most reasonably accessible.

Appeal from the District Court of the United States for the Southern District of New York.

Wallace, Circuit Judge.

The libellant appeals from a decree dismissing a libel filed to recover damages for the decay and deterioration of a lot of beef shipped in good order at New York upon the steamship in a refrigerator, under a bill of lading for transportation to and delivery at Bristol, England. 57 Fed. 317. Upon the voyage the steamship fell in with a vessel disabled and in distress, and took her in tow, and, in performing the salvage service, deviated from the voyage, and was detained thereby about four days beyond the ordinary voyage period. The deviation was only such in distance and duration as was necessary to enable the steamship to take the vessel to a place of safety. In consequence of the delay, the condition and value of the beef was materially impaired.

If the deviation was, under the circumstances, justified by the provision in the bill of lading in respect to liberty to tow and assist vessels in all situations, the libellant has no just cause of complaint.

It is urged for the appellant that the clause in question is not intended to authorize a deviation to earn salvage at the expense of the cargo; that to construe the clause so as to permit this would be subversive of the object of the contract; and that the only rational construction is that it exempts the carrier from becoming an insurer against accepted risks. In construing such clauses, they are to be read in the light of the general purposes of the contract, and reconciled, so far as may be, with all of wits expressed and implied conditions. They are not to be permitted to operate to the extent of their literal scope when this would be inconsistent with the substantial objects of the contract. One of the fundamental conditions of the contract by bill of lading is the obligation of the shipowner to be diligent in carrying the goods on the agreed voyage, and to carry them directly, without any unnecessary deviation; and a construction of the clause which would permit him to abandon the voyage, and go in search of a salvage service at his option, and merely for his own profit, would be inadmissible, as subversive of that obligation, and giving the shipowner a power obviously beyond any which the shipper could have contemplated. "Liberty to do something outside the voyage must be construed with reference to that, and as intended to be consistent with it." *Carv. Carr. by Sea*, §286. When a vessel has deviated from her proper course, the shipowner is not only liable for the delay, but he becomes absolutely responsible for any loss or damage to the goods which may have occurred during the deviation, and which can be attributed to it. He is not protected by the exception of perils in the contract, and becomes practically an insurer against the excepted risks. The clause giving the privilege to deviate would undoubtedly protect him against such a liability. Effect, therefore, can be given to it without importing a privilege of

assisting vessels unnecessarily, or under circumstances unreasonably injurious to the interests of cargo owners. But, if the only purpose of the clause were to protect the shipowner against liability as an insurer against the excepted risks, that intention could have been easily expressed, and in short and explicit terms. The nature of the privilege, as well as the language, requires that it should not be fettered by a narrow or illiberal construction. "It is the duty of all vessels to give succor to others in distress. None but a freebooter would withhold it." Lord Stowell, in *Laing v. Glover*, 5 Taunt. 49. A deviation to save life is justifiable, and, while the weight of authority has not sanctioned a deviation made merely to save property, the tendency of modern opinion, founded upon considerations of public policy, is illustrated by the recent act of congress which provides that neither the vessel nor her owners shall be held responsible for damage or loss resulting from attempting to save life or property at sea, or from any deviation in rendering such service. Act Feb. 13, 1893. The clause does not require a contracted construction upon the theory that it is a one-sided provision, which inures merely for the benefit of the shipowner. Not only is it to be assumed that the cargo owner has received a consideration for it in a reduced rate of freight, but, as was pointed out in *Stuart v. Navigation Co.*, 32 Law T. (N. S.) 257, such a provision is for the general benefit of the whole body of shippers, whose losses caused by the delay incident to the exercise of the privilege in some instances are counterbalanced by their gain in others, when but for it their property would perish. Undoubtedly, some limitation must be implied in the general liberty to tow and assist, given by the clause. In *Stuart v. Navigation Co.*, supra, the question was somewhat considered, and the observations of the judges show the difficulty in defining the precise scope of the privilege, and attempting to decide when and how far a vessel may go to the assistance of another in exercising it. We think it may be rationally construed as authorizing the vessel, when, in the ordinary course of the voyage, she falls in with another in distress, to go to her assistance, and tow her to such place of safety as, under the particular circumstances of the case, is most reasonably accessible. For these reasons, we are unable to accede to the construction of the clause urged for the appellant, and placed upon it by the learned judge whose decision we are called upon to review, and we conclude that the deviation made by the steamship was justifiable, as within the terms of the privilege. This conclusion leads to an affirmance of the decree, and renders it unnecessary to consider whether the steamship should have been exonerated upon any other ground by the district court. The decree is affirmed, with costs.

PLANS FOR A SUBMARINE TORPEDO BOAT.

Plans for the New Holland submarine torpedo boat, prepared by the inventor, have been considered by the board of bureau chiefs of the navy department at Washington and sent to the bureau of construction to ascertain whether any changes are necessary. In a few days the board will meet again to consider the report of the construction bureau, and preparations for building the vessel will probably be initiated without delay. By this action the Holland boat has been adopted by the navy department.

BAY CITY'S LUMBER SHIPMENTS.

There was more lumber shipped from Bay City last week than during any single week for several years, while last Thursday takes the lead in the matter of the greatest shipment for any single day, the amount being 2,650,000. The record for the week is 8,715,000 feet of lumber and 600,000 shingles. During the same time nearly half as much lumber was received here from up shore and Lake Superior points, the amount being 4,315,000 feet. Coal receipts were 1,200 tons.

A VINDICATION.

The rather sensational and greatly exaggerated marine dispatch from Amherstburg, which appeared in the *Courier* August 30, referring to the stranding of the passenger steamer North West, has caused much ill feeling, not only on the part of the Northern Steamship Co. people, but also among Buffalo passengers who were on board the vessel when she drifted ashore owing to the

breaking of her rudder chain. The facts of the case are as follows:

While turning Bar Point light, at the entrance to Detroit River, on the afternoon of August 29, the passenger steamer North West, of the Northern Steamship Co., broke her rudder chain and drifted out of the channel into shoal water, where she anchored pending repairs. A strong northwest wind lowered the water and the ship grounded and was not released until the wind abated and the water had again risen. The grounding of the North West was made the occasion for overzealous newspaper correspondents to send broadcast over the country sensational and misleading dispatches, which were given great prominence by newspapers in all directions, greatly prejudicing public opinion to the detriment of an enterprise that deserves cordial support. There was no panic, no breaking of furniture, no damage of the slightest description and no alarm whatever was felt by the passengers. In view of the wide publicity given these sensational reports the undersigned, who were passengers on that trip, bespeak from the press the same prominence for this statement of facts as were given the erroneous dispatches.

Charles F. Bishop, mayor.

Howard H. Baker, postmaster.

George S. Gatchell, commissioner public works.

J. W. Bridgman, vice president Buffalo *Courier* Co.

William C. Bryant, attorney.

William P. Henry, manager Lehigh Valley Transportation Co.

William C. Warren, proprietor Buffalo *Commercial*.

Henry W. Box, attorney.

John N. Scatcherd, president Bank of Buffalo.

C. W. Miller, Buffalo Omnibus & Carriage Co.

George Urban, jr., president Buffalo Loan, Trust & Safe Deposit Co.

D. H. Wilcox, Western Transit Co.

—The Buffalo *Courier*.

WEEKLY EXPORTS.

The exports from the several following lake ports for the week ending September 10, were as follows:

Buffalo, N. Y.—Coal shipments, 50,100; 10,624 barrels of flour; 89,901 sacks flour; 313,989 bushels wheat; 742,268 bushels corn; 931,231 bushels oats.

Duluth, Minn.—Wheat, 1,650,000 bushels; lumber, 4,000,000 feet; flour, 205,000 barrels; ore, 60,000 tons.

Port Huron—122,310 bushels corn; 49,158 bushels oats.

Milwaukee—25,000 bushels wheat.

Erie—6,925 barrels flour; 27,093 sacks flour; 15,000 bushels corn.

Ogdensburg—50,000 bushels corn; 93,343 bushels oats.

Kingston—37,497 bushels wheat.

COURTEOUS COMMUNICATIONS.

The following letter was sent a few days ago to Messrs. Ashley & Dustin, of Detroit, managers of the steamer Frank E. Kirby.

To the managers and owners of the steamer Frank E. Kirby:

GENTLEMEN:—At a meeting of the directors of this corporation, held this day, September 5th, I was directed to tender to you a vote of thanks for the timely and effective service rendered by your steamer, Frank E. Kirby, to our stranded steamer, City of Cleveland, by taking her passengers off and releasing her from North Bass Island shoals on the evening of September 1st. Hoping that you may never get aground, but wishing that opportunity may occur when we may in some measure repay you in kind, I remain,

Yours respectfully,

DAVID CARTER, General Manager.

A letter, enclosing \$100, was sent to Capt. A. J. Fox, of the Kirby, and similar letters, each enclosing \$50, were sent to Hugh McAlpin, mate, Edward Parry, chief engineer, and W. H. McFall, Jr., clerk.

Ashley & Dustin sent the following reply to the letter: D. Carter, General Manager Detroit & Cleveland Steam Navigation Co.:

DEAR SIR:—Yours of September 5th, informing the managers and owners of the steamer Frank E. Kirby of the action taken by the corporation of which you are general manager, on motion of the president, is received. We assure you the owners of the Kirby are happy to know that their steamer was able to render the service which you so fully appreciate. We also tender your corporation sincere thanks for your liberal presents to the officers of the boat. Your kind words of appreciation to the officers and owners will always be remembered. Respectfully yours,

ASHLEY & DUSTIN,
Managers steamer Frank E. Kirby.

THE SALT IN THE SEA AND WHERE IT GOES TO.

From an Article by Rev. J. A. Dewe in *Nautical Magazine*.

It is well known that common salt is found in every part of the ocean, but not every part is equally saturated with it. In those regions where the sun is intensely hot, and where as a consequence a greater amount of vapor is carried up, there more salt will be found, for the heat cannot raise the particles of salt except in such infinitesimal small quantities as to be altogether imperceptible. The water, therefore, that is left behind is rendered salter. Those seas, on the other hand, in which little evaporation takes place, the quantity of salt is comparatively less. Such is the case in the Baltic Sea, where the waters are almost fresh in their quality.

The sodium chloride, or common salt, that is found in the sea can be attributed to the same source as the carbonate. It is poured into the ocean, that is to say, by the rivers and streams of our continents and islands. Our rivers, though supposed to contain naught but fresh water, yet, in reality, contain small quantities of salt, which being carried hourly, and daily, and yearly into the sea, soon suffice to saturate it thoroughly with the briny element.

The amount of salt contained in the sea is so great, that if it could, by some powerful process, be abstracted from the sea and spread over the northern part of our continent it would cover the ground to the depth of one mile; and this quantity would, if there were no removing agent, be continually increasing, till our great oceans would, in course of time, become as salt and as deadly as those of the Dead Sea. The continual evaporation that is carried on is one of the principal agents in its increase. In vast tracts of the ocean, where the heat is greatest, fifteen feet of surface water in the course of a year is lifted up into the air leaving behind its residue of salt, and this process is carried on for thousands of square miles. Then only a small quantity of the vapor thus carried up returns direct to the sea. It is borne away by aerial currents to terrestrial regions, there it is precipitated in the shape of rain, which percolates through the soil, and enriched again with a burden of salt, returns to the briny deep.

There must, therefore, as in the case of the carbonate, exist some agent or agents by which the superfluous amount of salt is removed.

What the effects of this agent are, we have in the numerous salt mines that have been discovered in the bowels of the earth, and which rival in size and magnificence even those of the coaling districts. One of the most important of these and which for its peculiar structure leaves the strongest impression upon the mind, is that at Salzburg. The salt is there obtained by a process of saturation and distillation. Water is allowed to flow into a basin of salt until it becomes absolutely saturated with it, upon which the water is boiled off in series of vats, leaving behind their residue of hard, solid salt, while long passages, excavated from the same material, lead from one part of the vast subterranean palace to another.

In various other parts of the world are found similar storages of salt, and all give clear and unmistakable tokens of being by some mysterious process extracted from sea water. The fossils that are found in the strata immediately surrounding that of the salt, are those that pertain to marine shores, and betoken it as clearly as in our day the sea shells betray and characterize the presence of the sea shore. Moreover in the mass of the salt itself buried beneath its surface, are found, fossils of various organisms.

At first it was extremely difficult to assign any certain and definite cause for these enormous deposits, and various conjectural theories were resorted to. One of these was the action of salt springs. Springs that rise from the earth usually deposit on the surface of the soil secretions of any particular mineral with which they are saturated. Thus springs of iron water invariably characterize their presence by a red sediment of iron varying in thickness and solidity, according to the circumstances of the locality. If it be a spot well protected from the heavy rains, and yet exposed to a certain amount of heat, the quantity of mineral found on the surface will be greater than that deposited in less favored localities. In the same manner springs of salt deposit their burden upon the surface of the soil immediately surrounding them. But these deposits, even

though we imagine them as being found under the most favored conditions, yet never amount to more than two feet in depth at most, and certainly hold no proportion whatever with those huge masses which strike with wonder the eye and imagination of the beholder. Another hypothesis was that of the action of storms. It was supposed that on a flat coasting line, the sea would advance more than usual into the interior of the land, and afterwards retiring would leave behind small ponds or lagoons of sea water, which being dried up by the sea, would leave large deposits of the salty element. But this hypothesis has also been found totally inadequate to explain the effect in question, for such, unless made artificially for the purpose (and this is impossible, for we are treating now of prehistoric times) would only be of a very superficial depth.

There must, therefore, be some other agent at work. And a more enlightened knowledge of the transformation that nature carries on around us, suffices to show not only that there is such an agent, but also what that agent is.

It is a well-known fact that the surface of the earth is continually changing. Portions are rising gradually to a higher level, while others are undergoing a corresponding depression. Whether owing to the action of internal forces, or to the revolution of the earth itself, with such velocity through space, or as it is most likely, owing to both these causes acting together, there is not one single part of the globe that is not undulating like the unstable element of the sea. Even the experience of the last twenty years, has shown how lands, that were once under the surface of the sea, by a gradual upheaving from below, are now reclaimed, and seem with the labor and industry of man, while other parts of the coast, by a corresponding process of sinking, are severed from the mainland. A striking example, though of course of very ancient date, we have in the Straits of Dover. Research shows that the narrow "Silver Streak" was once terra firma, joining together the now separated countries.

This gradual depression in certain parts of the globe is the chief factor in the removing of the superfluous salt from the sea. By it certain parts of the sea are cut off from the main portion. Thus, in course of time, an immense salt water lake is formed. By degrees, owing to the action of the warmth of the sun and the evaporating influence of the dry winds, the water is gradually removed, leaving behind an immense deposit of sea salt. Thus the superfluity is removed by a two-fold process; first by the gradual subsidence and sinking of certain parts of the sea, and secondly, by the evaporation carried on by the combined action of sun and wind.

Such are the principal agencies in the storage of the carbonates and salts under the surface of the sea and the removal of their superfluity. In both cases it will be easily seen that there is a circle. The land gives to the sea, and the sea, in its turn, by the work of its living inhabitants and the subsidence of certain portions of its bed, gives back to the land, and furnishes the material of future continents and islands. As to where the circle begins, it is impossible to say. As we said in the beginning, the circle is found in nature, and all we can do is to follow its harmonious and progressive movements with ever-increasing wonder and admiration.

IRON AND STEEL PRODUCTION.

The annual statistical report of the American Iron and Steel Association shows that the production of iron ore in the United States in 1893 was 11,587,629 gross tons, against 16,296,666 tons in 1892. The production of pig iron in the United States in 1893 was 7,124,502 gross tons, against 9,157,000 tons in 1892. The decrease in pig iron was almost entirely in the second half of 1893, the production in the first half being 4,562,916 tons, and in the second half only 2,561,584 tons. The production of pig iron in the first half of 1894 was 2,717,983 tons, which was but slightly in excess of that in the second half of 1893.

A GENEROUS GIFT.

Besides his subscription of \$5,000 cash to the relief fund of the sufferers from the recent forest fires, President J. J. Hill of the Great Northern Railroad and of the Northern Steamship Co., has given 5,000 acres of good agricultural lands for the Hinckley survivors. The lands are valued at \$8 per acre, or \$40,000 in the aggregate, and will be given to the people for homes.

TO SUE THE CRAMP SHIPBUILDING CO.

Attorneys representing Charles G. Lundborg, of New York, have filed a bill of complaint in an important suit against the William Cramp & Sons' Ship and Engine Building Co., for alleged infringement on a patent for improvements in the construction of vessels' hulls, etc.

The Cramp Shipbuilding Co., it is charged, without license of the complainant, infringed upon the patent in using the invention on two ships and is continuing to use it upon other vessels. Mr. Lundborg says he notified the Messrs. Cramp to desist from infringing on the patent, but that his request was disregarded. He claims to have been injured to the extent of \$300,000. The court is asked to direct the defendant company to render an accounting of the profits derived from the unauthorized use of the invention, and to grant an injunction restraining the further use of the same.

It is understood that the improvement in the construction of the hulls of vessels covered by the patent is the inclosure of the propeller shaft of steamers within the hulls in such a way that they can be easily reached at all times, thus being a safeguard against accident. The two vessels on which the invention is said to have been used are the St. Louis and St. Paul, now being built for the International Navigation Co., better known as the American Line.

In reply to questions Mr. Charles Cramp said: "I do not think it would be advisable in me to discuss a case which I have placed in the hands of a lawyer, and which will come before the court to be disposed of. I could not give you an intelligible explanation of the device which is claimed to be an infringement. If I were to undertake to describe the nature of this device it is so purely technical a part of the vessel's motive machinery that you would find it difficult to place it in an intelligent way before the public. I will say, however, that Capt. Lundborg is not unknown to me, nor to this firm. He has visited this yard and tried to sell us a device some time ago which he now claims we have infringed upon."

"It is the first time in my experience that I have ever heard of any portion of a ship's hull being the subject of a patented right. Capt. Lundborg has claimed patents at times for designs of patents that I never heard, and this is not the first time we have heard of him. He is quite familiar to us, and I have nothing to say about this suit further than that our side of the case is in the hands of our counsel."

IN THE MILWAUKEE DISTRICT.

The arrivals at the port of Milwaukee for August, 1894, according to the records in the office of the collector of customs, were 818, against 693 for the corresponding period of last year, and the tonnage 499,325, against 468,873 last year; the departures were 784, with a tonnage of 488,394 in 1894, against 670 with a tonnage of 444,695 in August, 1893.

At Sheboygan the arrivals were 136, against 117 in 1893, with a tonnage of 53,091, as against 37,683 in 1893. The departures were 135 with a tonnage of 54,117, against 117 with a tonnage of 37,489 in 1893.

At Manitowoc the arrivals were 139 with a tonnage of 62,834, against 108 with a tonnage of 41,534, in 1893; the departures were 139 with a tonnage of 62,926, against 106 with a tonnage of 40,977 in 1893.

At Marinette the arrivals were 76, tonnage 17,340, against 94, tonnage 26,363 in 1893; the departures were 76, tonnage 17,340, against 94, tonnage 26,363 in 1893.

At Green Bay the arrivals were 119, tonnage 34,950, against 101, tonnage 34,702, in 1893; departures 121, tonnage 31,881, against 105, tonnage 35,087 in 1893.

At Racine the arrivals were 106, tonnage 50,856, against 96, tonnage 41,280 in 1893; departures, 106, tonnage 50,681, against 96, tonnage 41,280 in 1893.

At Kenosha the arrivals were 40, tonnage 6,152, against 37, tonnage 5,635 in 1893; departures 40, tonnage 6,152, against 33, tonnage 4,982 in 1893.

At Kewaunee there were 23 arrivals, with a tonnage of 8,291, and 23 departures, tonnage 8,728.

At Sturgeon Bay there were 242 arrivals, tonnage 76,604; departures 293, tonnage 76,494.

The total arrivals at all the Wisconsin ports named was 1,700 and the tonnage 809,443, in 1894, against 1,246 in number and 656,070 in tonnage in 1893. The departures were 1,717 and tonnage 766,713 in 1894, against 1,221 in number and 630,873 in tonnage in 1893.

THE MARINE RECORD

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CLEVELAND, O., SEPTEMBER 13, 1894.

THROUGH the carelessness or culpable negligence of the Cleveland post office officials a number of sacks, containing part of the city edition of THE RECORD, issue of Sept. 6, addressed to Cleveland subscribers has been sent we believe to San Francisco. Any subscribers who may have missed the issue by mail will do us a favor by notifying this office, when an extra copy will be mailed to them.

THE U. S. Weather Bureau has discontinued the use of the cautionary signal, red flag with a white center, heretofore displayed at all lake stations, and in place thereof will hoist the red pennant, but as this pennant is also used as an information signal when storms are expected on other lakes, it would be well for shipmasters on seeing the red pennant displayed to ask the station for further information. The foregoing is thought to be a necessary reminder on account of an impression being abroad that the Weather Bureau has entirely discontinued the display of wind signals at lake stations.

THE joint committee of citizens from Duluth and Superior evidently intend to make all they can of their splendid natural harbor. In compliance with their request through Congress, the secretary of war has appointed a commission of officers of the corps of engineers, consisting of Gen. O. M. Poe, Detroit; Major James F. Gregory, Milwaukee, and Major Clinton B. Sears, Duluth, to assemble at Duluth at the call of Gen. Poe, to examine the harbors of Superior and Duluth and the entrances to the same with a view to ascertaining the cost of deepening these harbors and their entrances to a uniform depth of twenty feet, and to report their conclusions to the secretary of war. It is expected that the meeting of the committee of the corps of engineers will take place at Duluth on the 24th of this month.

TRAFFIC THROUGH THE "SOO" CANAL.

According to the official statement of traffic through the St. Mary's Falls Canal for the month of August, it is shown that 1,583 steamers, 585 sail craft added to a total rafts and unregistered cargo numbering 101, makes a total monthly traffic of 2,269. Total registered tonnage, 1,991,996; total freight, 2,290,791; number of passengers, 8,700. Comparison with the corresponding month of last year: Passages, 1894—2,269; 1893—1,815; increase, 454; registered tonnage, 1894—1,991,996; 1893—1,391,758; increase, 600,238; freight tonnage, 1894—2,290,791; 1893—1,580,110; increase, 710,681; passengers, 1894, 8,700; 1893—5,660; increase, 3,040. This traffic for the month not only exceeded that of August of 1893, as shown by the above, but exceeded that of the greatest previous month—July, 1893—in the history of the canal by 273,608 tons of freight. August also shows the largest day's freight traffic in the history of the canal by 10,748 tons, 105,097 tons having passed through on the 20th inst. The traffic through the canal in August, 1894, was greater than for the whole first eight and a half years of the canal, thus exceeding the entire commerce from 1855, the year the canal was opened, to the middle of 1863. On the 20th of August, this year, 105,097 tons of freight, as above, passed through the canal, thus exceeding in amount the entire freight that passed through the canal in either of the first two years.

THE TORONTO CANAL CONFERENCE.

It is now less than a week before the talent of the Western country will assemble at Toronto, Canada, to discuss an international waterway to the coast with an outlet down the St. Lawrence through Canadian territory.

The effect of such a conference will probably be to hasten the appointment of an international commission, composed of representatives from each government to consider the most feasible plan for opening up deep water communication with the coast. It may be asked why Canada herself does not proceed with this work if her most prominent citizens are assured of its commercial importance, but it must be borne in mind that the Dominion has already spent vast sums of money on artificial waterways, and their keep-up is a financial question which annually bothers the legislators of that country; furthermore, it is rightfully considered that the bulk of the transportation would be carried under the American flag, and in these days there is less inclination than ever to pay tolls for using a waterway, so that the work of construction and expense of maintaining so large a waterway would rest mainly with the government building the deep water canal. What is wanted, and the point desired to be reached through the conference, is a joint outlay between the United States and Canada in constructing and operating the canal. This we feel certain will not be accomplished, yet the fact of the meeting being held will accelerate the opening of a waterway to the coast through American territory.

The New York Chamber of Commerce is distinctly opposed to that city being side-tracked through a commodious outlet being made via the St. Lawrence, and in reply to an invitation to join the conference at Toronto, breaks out in the following strain:

"While the constitutional convention of this state is quibbling over whether the people would support an undertaking of this sort a call has been issued by the public officials of Toronto, Ontario, and invitations extended to commercial organizations all over the United States, for a meeting to be held in that city on September 17, to discuss ways and means for providing a twenty-foot channel from the upper Great Lakes to the sea, in order to accommodate the western traffic without breaking bulk. The direction of this channel is to be from the lakes down the St. Lawrence River, or within Canadian territory entirely. Yet there are deluded people who catch at the chimerical idea of a twenty-foot channel from the lakes to the sea, by whatever route, in order that the upper lake cities may be made seaports, forgetting that such a channel, when completed, would inaugurate the destruction of our magnificent fleet of lake vessels and in large part the traffic of the Erie and Oswego and Champlain canals, and thereby destroy the commercial supremacy of the state and port of New York.

"The impertinence of asking the people of the United States to join them in discussing ways and means for such an undertaking in part wholly upon Canadian territory—it is in keeping with the phenomenal brass which has characterized the entire dealings of the Canadians with Americans. But whether the great State of New York is going to co-operate in such a scheme, which, if completed, means its commercial and financial destruction, we shall not believe until we see the proof. The best answer that New York can send to this invitation of the people of Toronto is for the constitutional convention of this state to provide for the improvement of the Erie, Oswego and Champlain canals, in order to retain within this state the great traffic which has so vastly enriched it, and upon which the future so vitally depends."

As we have said the subjects of the convention's deliberation, which will last from the 17th to the 20th of this month, will be the best methods and routes for the construction of waterways that will connect the ports of the Great Lakes with the ocean, making them to be harbors for the world's commerce, instead of ports of interstate or of merely continental trade.

Given a canal with twenty feet of water and there will be a cheapening of coal to the consumer, concurrently, perhaps, with an increase of price to the miner, certainly without a decrease of price at the pit's mouth. That same is true as to lumber and grain; it is freight that counts. It is quite possible to have grain selling at 2 cents more on the spot of production if the freight from place of growth to the final market be reduced by 5 cents. An eminent financier of the Dominion, has estimated that a really deep waterway would so cheapen freight rates as to add \$120 a year to the value of the crops of a 160-acre farm in the Northwest.

The United States Interstate Commerce Commission puts the cost of railroad freight at 9¼ mills per ton per mile; compared with the freights of a quarter of a century ago this is absolutely a lower average rate than obtains in Europe.

It is not to be wondered at, however, that New York should decry any attempt to reach the coast except through the Erie canal system when it is shown that the amount of grain that was shipped from Buffalo to ports outside of New York in 1893 would have paid in canal freights alone the sum of \$6,000,000, if that state had been equal to the occasion and improved the Erie canal. Furthermore, a corresponding sum would have been received for west-bound cargoes, which were diverted to other routes outside of the State of New York.

The outcome of the Toronto convention will at least awaken New York to a proper sense of her duty to commerce in improving the DeWitt Clinton ditch so as to meet in a measure the needs of modern transportation. Otherwise a vast portion of the trade will be diverted to other channels where greater facilities are offered.

IRON MANUFACTURE.

According to Mr. James M. Swank's valuable annual report of the Iron and Steel Association, a prosperous outlook may be heralded in lines directly connected with lake business.

Reviewing the season of 1893, Mr. Swank says: "Bad as 1893 was, the production of coal of all kinds in that year was 2,699,735 gross tons more than in 1892. The shipments of anthracite coal were greater in 1892 than ever before, but in 1893 they were 1,196,216 gross tons greater than in 1892. The pig iron production for the year showed a heavy decline, but this decline was almost entirely in the second half of 1893. The production of Bessemer ingots in the first half of 1893 was actually greater than it was in the first half of 1892, and fell short less than 1 per cent of the production in the second half of 1892. The pig iron production in the first half of 1893 was more than that of the second half of 1892, and less than that of the first half, but the products of the three half years do not vary greatly, and the production for the whole of 1892 was the largest in our history."

"In the first half of this year the iron industry suffered severely from strikes among the coal miners and coke workers. In spite of this fact, the production of pig iron in the first half of 1894 was 156,399 tons greater than in the second half of 1893, and in Bessemer pig alone the increase was 307,779 tons, or more than 25 per cent. The production of all Bessemer steel was greater in the first half of 1894 than in the last half of 1893 by 543,825 tons, or very nearly 50 per cent."

LAKE FREIGHTS.

The rate from the head of Lake Superior on ore has improved 5 cents, also at Marquette, though Escanaba is steady at former quotations. There being quite a demand for ore, it is likely that 90 cents will be paid from the head of the lake in a few days. The 50 cent coal rate has been obtained, and it is perhaps as well that the shippers conceded the point, as a rate of 60 cents was about being insisted upon.

The Chicago grain freights are steady, the last quotations being 1½ cents on wheat and 1¼ cents on corn or oats to Buffalo. Duluth offers 2½ cents, with no takers at that figure on account of the improved ore rate.

Lumber, Ashland to Chicago, is now paying \$2, a raise of 25 cents for the week. Coal, Oswego to Lake Michigan, 85 cents; from Buffalo, 50 cents, and 30 cents to Duluth.

The Erie canal rate has advanced to 4 cents on wheat, with brisk shipments, marking an advance of ½ cent for the week.

VISIBLE GRAIN SUPPLY.

The stocks of grain in Chicago elevators last Saturday evening were 26,037,000 bushels of wheat, 1,457,000 bushels of corn, 1,327,000 bushels of oats, 157,000 bushels of rye, and 8,000 bushels of barley. Total, 28,986,000 bushels of all kinds of grain, against 21,717,000 bushels a year ago. For the same date the Secretary of the Chicago Board of Trade states the visible supply of grain in the United States and Canada as 69,168,000 bushels of wheat, 3,646,000 bushels of corn, 7,875,000 bushels of oats, 322,000 bushels of rye, and 1,121,000 bushels of barley. These figures are larger than the corresponding ones a week ago by 2,219,000 in wheat and 495,000 in corn. The visible supply of wheat for the corresponding week a year ago decreased 741,000 bushels.

AGE OF NIAGARA FALLS.

Prof. J. W. Spencer says that the first conjecture as to the age of Niagara Falls was made by Andrew Ellicott in 1790. Ellicott believed the falls to be 55,000 years old. About 1841 Lyell estimated the age of the falls as 35,000 years. All of these estimates were pure conjectures, but they were correct in assuming that the gorge had been excavated by the river. Prof. Spencer, in outlining the progress of the falls, says that a little stream draining the Erie basin once fell about 200 feet from the brow of the Niagara escarpment. This stream was not over one-fourth the volume of the present cataract, and consequently excavated the gorge at a much slower rate than at present. During the early history of the river the waters of the three upper lakes emptied through the Huron basin by way of the Ottawa River. The height of the falls has increased several times. The first episode, represented by a small river falling 200 feet, lasted 11,000 years. Then the height of the falls was increased to 400 feet, and took the drainage of all the upper Great Lakes. At the same time there was a series of cascades, three in all, the lower gaining on the upper until finally they were all united in one great cataract, much higher than that of to-day. Subsequently the waters were raised at the head of Lake Ontario, and the falls approximated to the present conditions after a lapse of 1,000 years, and another 1,000 years was probably occupied by transitoral changes of a very gradual character. It is now 8,000 years since Lake Huron emptied into Lake Erie for the first time. The land has risen about the outlet of Lake Erie, and if the present rate of change continues, in 5,000 or 6,000 years the waters of the four lakes will be turned into the Mississippi River drainage at Chicago.

At least, to come down to more moderate figures, the American Association for the Advancement of Science, contemporary with other geologists, considered that 7,500 years perhaps met all the requirements to bring about the present Niagara gorge, while a few of the most scientific members thought 3,500 years sufficient to bring about existing conditions.

The geological survey of the Great Lakes tells of a former high continental elevation. The present bottom of Ontario is 491 feet below sea level; of Erie, 362 above; of Huron, 168 feet below; of Michigan, 288 feet, and of Superior, 406 feet. If these were once erosion valleys, they must have been at an altitude such as to allow their drainage to flow down to the sea. In keeping with this theory, Prof. Spencer finds that the lower St. Lawrence River is a submerged channel, increasing from a depth of 1,200 feet to 1,800 feet, and with deep tributary canons. Between the Georgian Bay and Lake Ontario lies a deeply buried valley, as found by a series of borings, through which the ancient Laurentian River must have flowed. There was a southern branch crossing the Michigan peninsula and the Huron basin, to which the name Huronian River is given. Through the Erie basin flowed a now submerged river, named the Erigan, which crossed to the great canon at the head of Lake Ontario—the Niagara River not then being in existence. These ancient valleys were broader than the modern streams, which have made for themselves new channels, instead of reopening the old ones filled with drift.

In certain instances, indeed, the river drainage has been actually reversed. This was shown by the studies of Dr. Newberry, T. Sterry Hunt and Mr. J. F. Carril. The theory is confirmed by recent investigations. The Susquehanna and its tributaries flowed into Lake Ontario, while the Ohio River, above Pittsburgh, flowed into the Erie basin. All this system of ancient drainage was obstructed by drift, and also by the warping of the earth's surface, as shown by deserted beaches, terraces and sea cliffs, some of which have been followed for hundreds of miles. The open water between these contracting beaches has been named by Prof. Spencer "Warren Water," which may be regarded as the mother of all the lakes, and which at one time must have covered 200,000 square miles. When the level fell 150 feet the three highest lakes were inclosed in what might be called "Algonquin Water," while Lakes Erie and Ontario were within the "Lundy Water." A further subsidence of 300 feet brought the waters to what is termed the Iroquois level, after which episodes of movement and repose formed the modern lakes.

The highest deserted strand near Chicago is 45 feet above the lake level. According to the canal survey,

the divide is 25 miles southwest of Chicago, and is only eight feet above the lake. From measurements of the sets of deserted beaches the depth to which they are depressed can be calculated. The indications are that the subsiding waters (Warren, Algonquin and Huronian) were drained through the Ottawa valley for about 24,000 years. This outlet was closed by the rim being raised so as to turn the overflow into the Erie basin, whose outlet was also affected by the same uplift, so as to drain all the upper lakes into the Mississippi valley. The subsiding of the waters lowered the lake level sufficiently to turn the volume through the Niagara. But as the terrestrial uplift of the Niagara region is about one foot and a quarter a century, it follows that, if this rate shall continue, the drainage of the upper lakes will, in about 5,000 years, be diverted back again into the valley of the Mississippi.

The Niagara River came into existence, according to Spencer, upon the dismemberment of the "Lundy Water," and for 1,000 years drained the Erie basin without a cascade. As the Ontario basin slowly sunk, the falls were made, until the total descent was 420 feet, there being at one time three cascades, and afterward one grand united fall. Finally, the Ontario waters began to rise again and reduced the height of the falls, at first to 365 feet and then to 320 feet. Mr. Spencer computes the entire age of Niagara River at about 32,000 years. This computation is based on the rate of recession and the amount of work done in each of the episodes, as discovered in working out the history of the lakes.

Spencer's method differs from others, in that he takes into consideration the changing episodes of the river as well as the rate of recession through said episodes. He denies that the buried valley of St. David, hitherto regarded as an extension of the preglacial river from the whirlpool on, is such, and affirms it to be a branch of a buried valley outside the Niagara canon, and much shallower than it. The rate of the modern recession has been determined under changing conditions of erosion, so that each episode has to be treated separately. First episode: Waterfall 200 feet high, volume 3-11 of the modern discharge, and gorge 11,000 feet long to the terrace of Foster's Flats; duration, 17,200 years. Second episode: River falling 420 feet in three cascades; (a) discharging only Erie waters through chasm 3,000 feet long; duration, 6,000 years; (b) drainage of all the upper lakes through chasm 7,000 feet long; duration, 4,000 years; (c) volume as before, also descent, but in one cascade, length of narrows 4,000 feet; duration, 800 years; (d) volume as now, and level of lower lake as at present; first stage, a local rapid, as at Johnson's Ridge, with total fall of 365 feet, work perpendicularly hard; length of gorge 5,500 feet; duration, 1,500 years; second stage, as at present, work easy; length of canon, 6,000 feet; descent of water, 320 feet; rate of recession, 3,175 feet a year; duration, about 1,500 years.

Thus Spencer computes the age of the falls to be 31,000 years, with 1,000 years added as the age of the river before the nativity of the falls. He thinks the turning of the Huronian waters into the Niagara was about 8,000 years ago. He finds the amount of work done in each episode by the position of the terraces and the changing effects of erosion. The modern recession is computed from four surveys extending over 48 years, but the rate is excessive, on account of favoring conditions.

The history of the Great Lakes must be taken into account, as already described, and also the rate of terrestrial uplift in the Niagara region. The end of the falls seems destined to be effected, not by erosion of the rocks, but by terrestrial deformation that shall turn the drainage of all the upper lakes back into the Mississippi, an event which it is calculated will take place in 5,000 years, which would be before the cataract would have had time to cut its way back to Buffalo.

SUBMARINE NAVIGATION.

According to the *Electrical Review*, London, all the maritime nations are concerned with, and we believe are studying, through the medium of their admiralty officials, the problem of submarine navigation. It is considered that a navy equipped with vessels which can be propelled at any depth beneath the surface of the water will possess enormous powers of offense. France, Germany, Italy, Spain, Great Britain (of course), and even Turkey, are at present engaged with the greatest

secrecy in endeavoring to produce a practicable form of submarine torpedo boat; but the problem has hitherto baffled them. It is true that some success attended the famous trials of the *Gymnote* in Toulon Harbor about two years ago, and it is claimed that the French have a boat, the *Gustave Zede*, which is capable of keeping up a speed of 14 knots for several hours below the surface of the sea, but these boats can hardly be said to have realized all the necessary conditions. From what we can gather, the key to the whole problem lies in the hands of electrical engineers. Steam cannot be employed as a motive agent on account of the absolute impossibility of disposing of the products of combustion. Compressed air gives no better results, the weight of the chambers in which it must be stored being too great; moreover, to dry the air thoroughly and the expansion of the necessarily enormous amount so lowers the temperature that ice forms in the pipes and renders them useless. Undoubtedly the direction in which progress, and, indeed, success, must be looked for is in electricity, more especially in the use of storage batteries. As yet, however, no system of accumulators has been discovered that is perfectly adapted to the needs of submarine navigation. Here, then, is a problem which those who are interested in secondary batteries may study, possibly with profit to themselves. The absolutely essential points are extreme lightness, considerable storage capacity and the absence of noxious gases at the moment of discharge. These must be borne in mind when entering upon a line of investigation. They are difficult points to reconcile among themselves, to say nothing of the conditions; but we venture to think that difficulty need not deter. If discouragement followed upon the recognition of the arduous nature of a problem, how few would ever have been solved by electrical engineers.

SERVE'S BOILER TUBES.

In point of economy, the Serve's patent ribbed steel boiler tubes are becoming generally acknowledged as being indispensable in the equipment of a modern steamer fitted with the Scotch type of boilers. The ten boilers of the new Fall River line steamer *Priscilla* are fitted with these tubes, and instead of burning 160 tons of fuel per round trip, it was found after a careful computation that in the month of July last the consumption was less than 131 tons, showing a saving of nearly 20 per cent. on the estimated quantity to be used if the boat had been fitted with plain tubes.

If it is accepted as a general proposition that a ribbed tube with the same area for the passage of gases will evaporate about as much water as a plain tube twice its length under the same conditions, then it would necessarily follow that by the use of ribbed tubes boilers may be largely reduced in length and yet develop all the power of a longer boiler with plain tubes.

Dealing particularly with the high speed modern passenger steamer *Priscilla*, of the Fall River Line, the following interesting figures are given on the basis of a 10 per cent. economy of ribbed over plain tubes, though a uniformly 15 per cent. economy in fuel or increased steaming capacity is found in some instances. However, at 10 per cent. the deductions are simply an "eye opener."

160 tons of coal per round trip at \$4.30 per ton.....	\$ 688.00
3 round trips per week at \$688 per trip.....	2,064.00
52 weeks at \$2,064 per week.....	107,328.00
10 per cent. of this latter sum amounts to.....	10,732.80

Therefore, an economy of upwards of \$10,000 annually gives in seven years—the shortest time which can be reckoned on for the life of the ribbed tubes, although they frequently last ten years—is as follows:

Saving in fuel for seven years at \$10,732.80 per annum....	\$75,129.60
Initial cost of ribbed tubes.....	\$20,476.15
Less cost of plain tubes.....	\$ 3,239.27
	\$17,236.88

Economy by the use of ribbed tubes in seven years' service \$57,892.72

From the foregoing it seems palpable that either coal bills are reduced 10 per cent. or else the steaming capacity of a boiler in which ribbed tubes are used is increased 10 per cent, while in vertical boilers with short tubes the difference in favor of ribbed tubes is placed at never less than 20 per cent.

THE steam barge *W. P. Thew* has been raised and found in much better condition than was anticipated. Capt. C. E. Benham had charge of the wrecking work for the Marine Bank, Cleveland, O., and completed the job to the satisfaction of all concerned.

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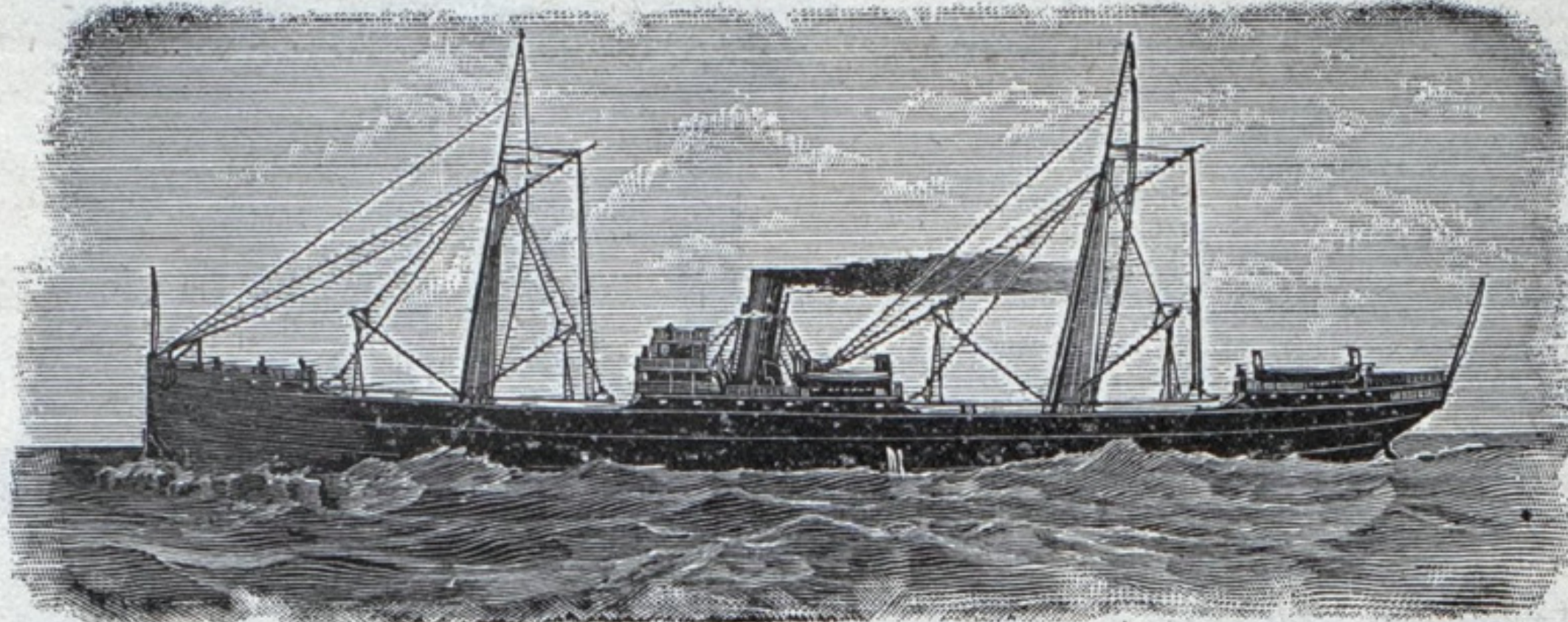
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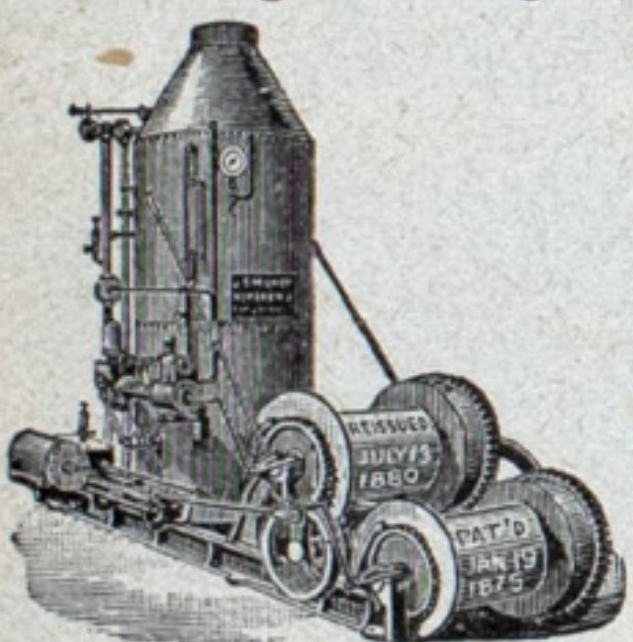
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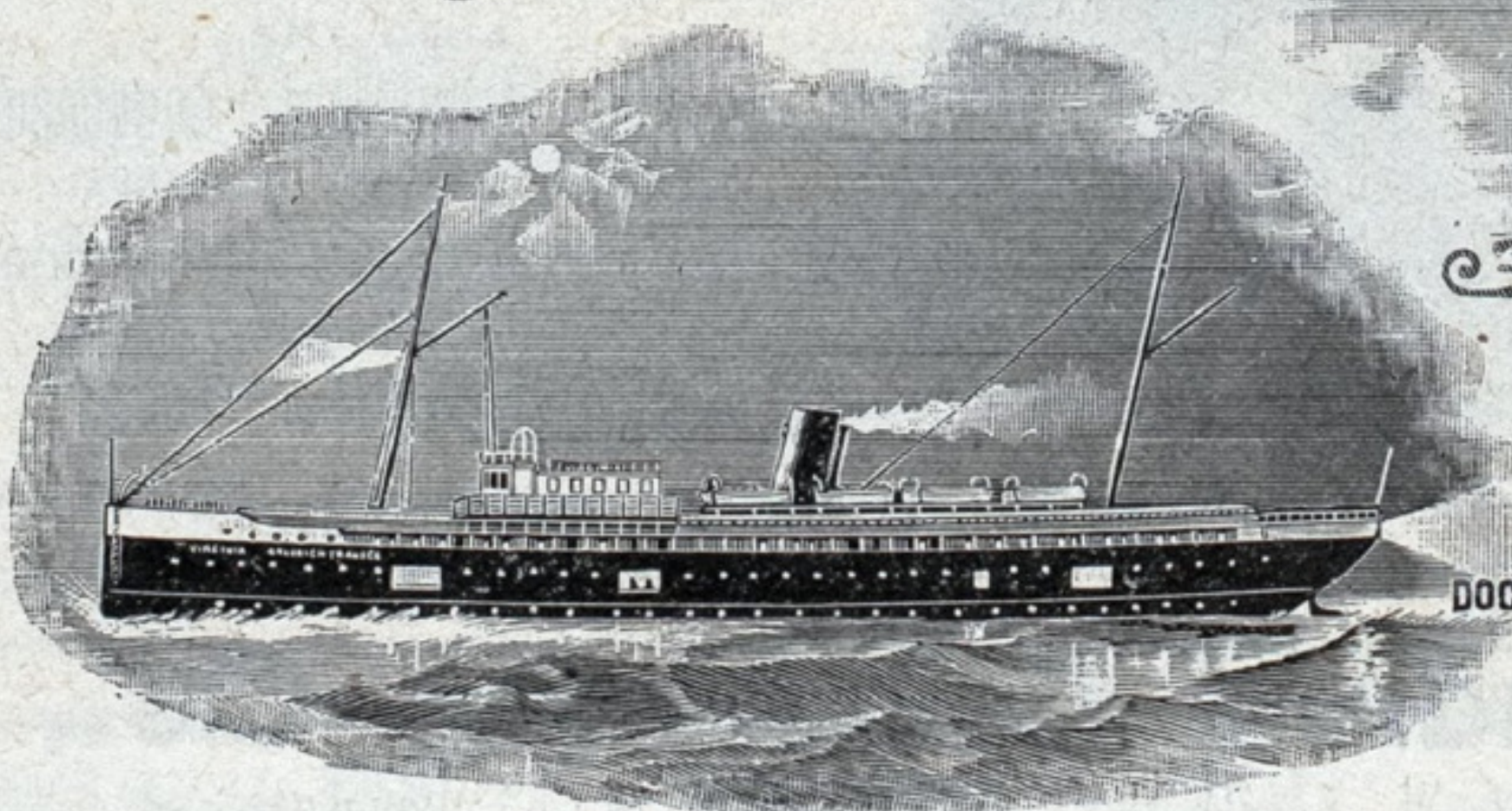
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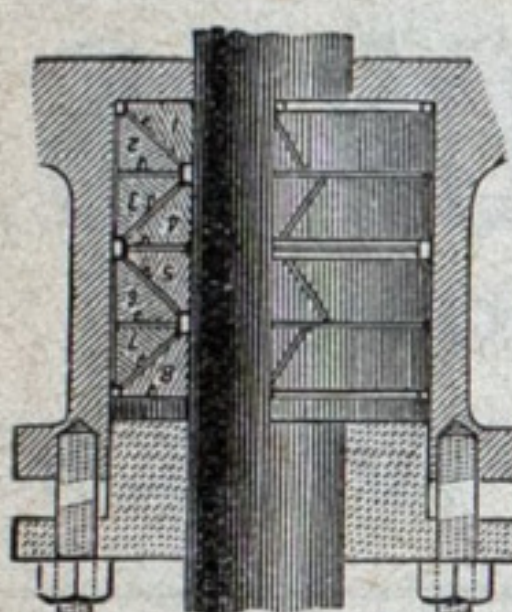
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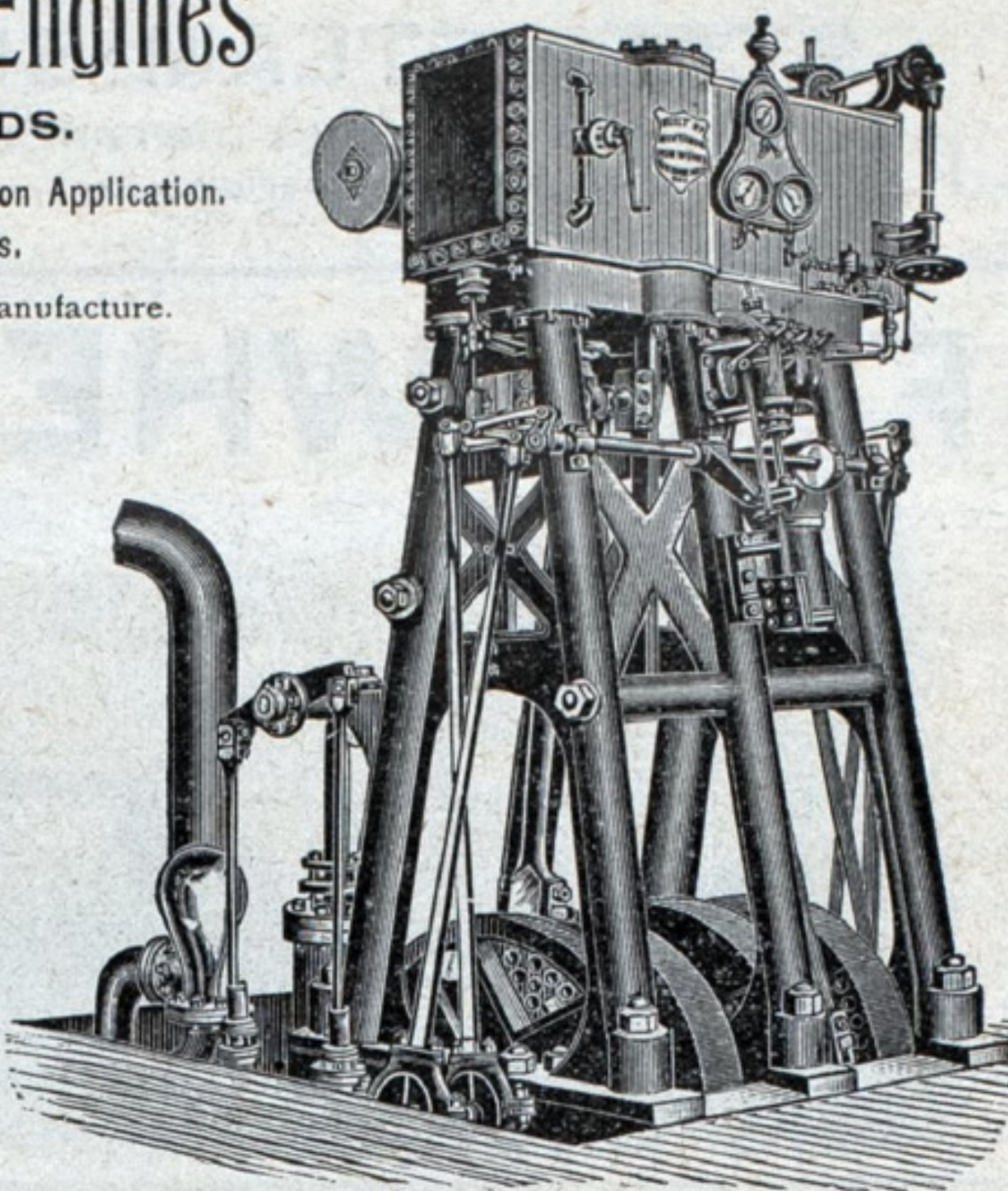
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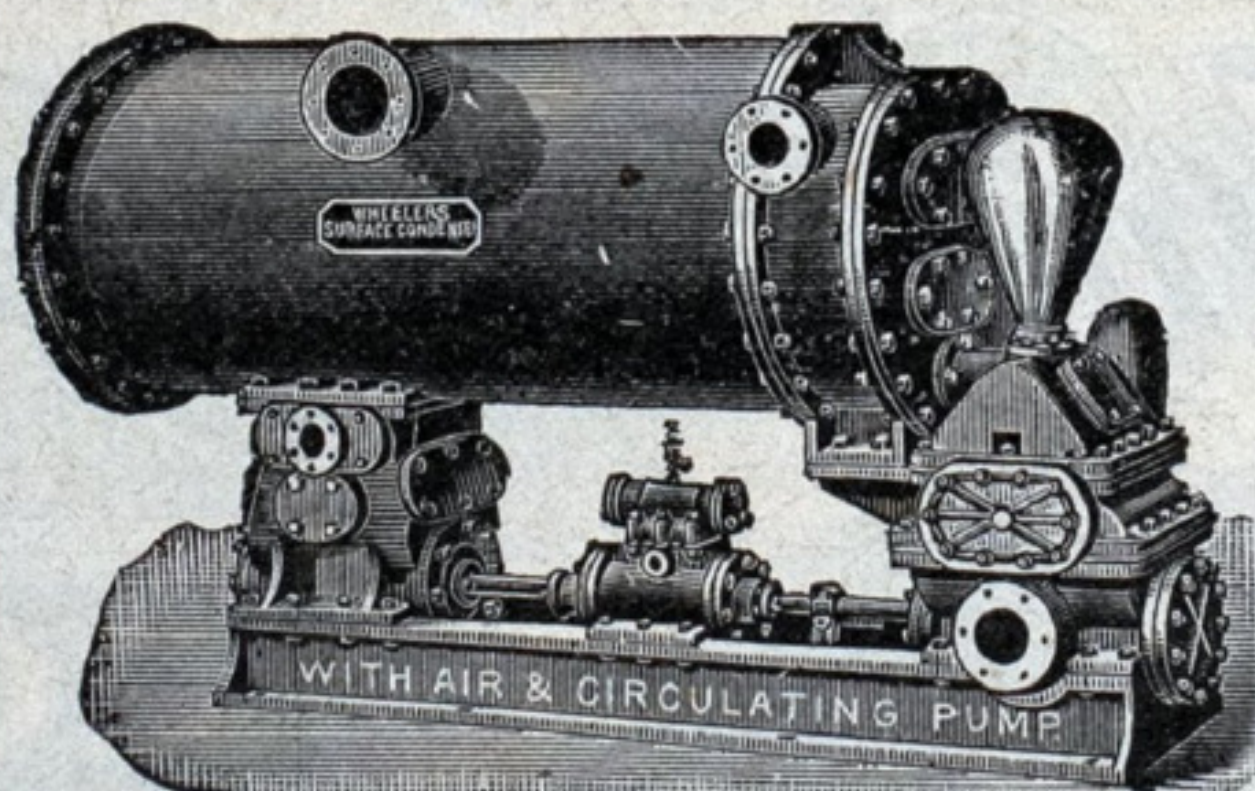


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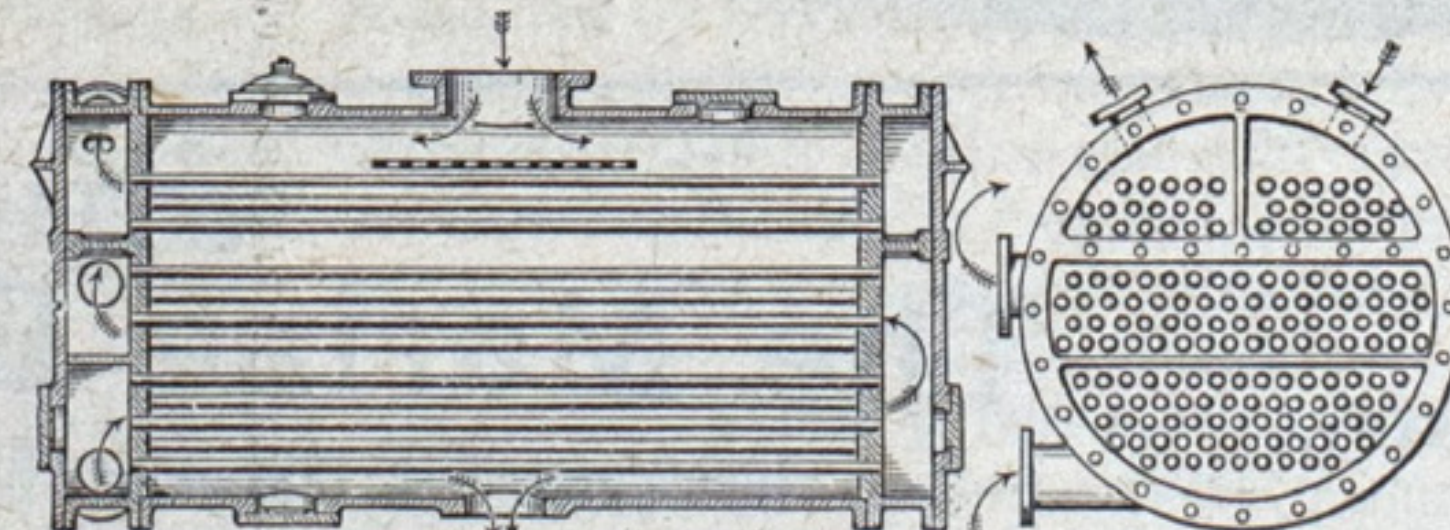
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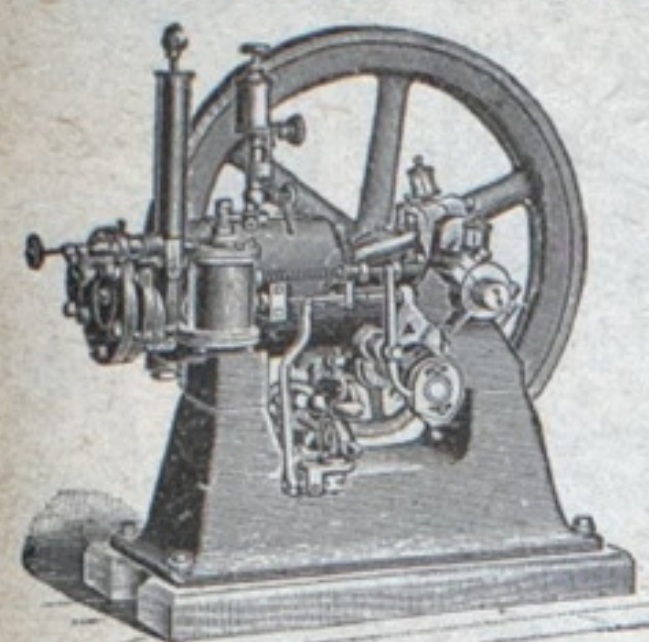
PROPOSALS.

U. S. ENGINEER OFFICE, 34 West Congress St., Detroit, Mich., September 12, 1894. Sealed proposals for furnishing all labor, materials and appliances, and removing Shoals of Boulders, both bedded and loose, and other material, from vicinity of Ballards Reef in Detroit River, will be received here until 2 p. m., standard time, October 12, 1894, and then publicly opened. All information furnished on application. O. M. POE, Col. Corps of Engineers. 37-40

U. S. ENGINEER OFFICE, 2258 Wabash Ave., Chicago, Ill., September 5th, 1894. Sealed proposals in triplicate will be received here up to noon, central time, September 25th, 1894, and then publicly opened, for the following river and harbor work. Chicago Harbor: Exterior Breakwater, rebuilding and repair of superstructure. Calumet Harbor: Rebuilding superstructure of piers. Calumet River: Dredging above and below the Forks. All information furnished on application. W. L. MARSHALL, Capt. Engineers. 36-38

U. S. ENGINEER OFFICE, 34 West Congress street, Detroit, Mich., August 23, 1894. Sealed proposals for furnishing all labor, materials, and appliances, and removing a shoal of bed rock and other material from Sec. 8, Ship Channel between Chicago, Duluth and Buffalo, will be received here until 2 p. m., standard time, September 22, 1894, and then publicly opened. All information furnished on application. O. M. POE, Col. Corps of Engineers. 34-37

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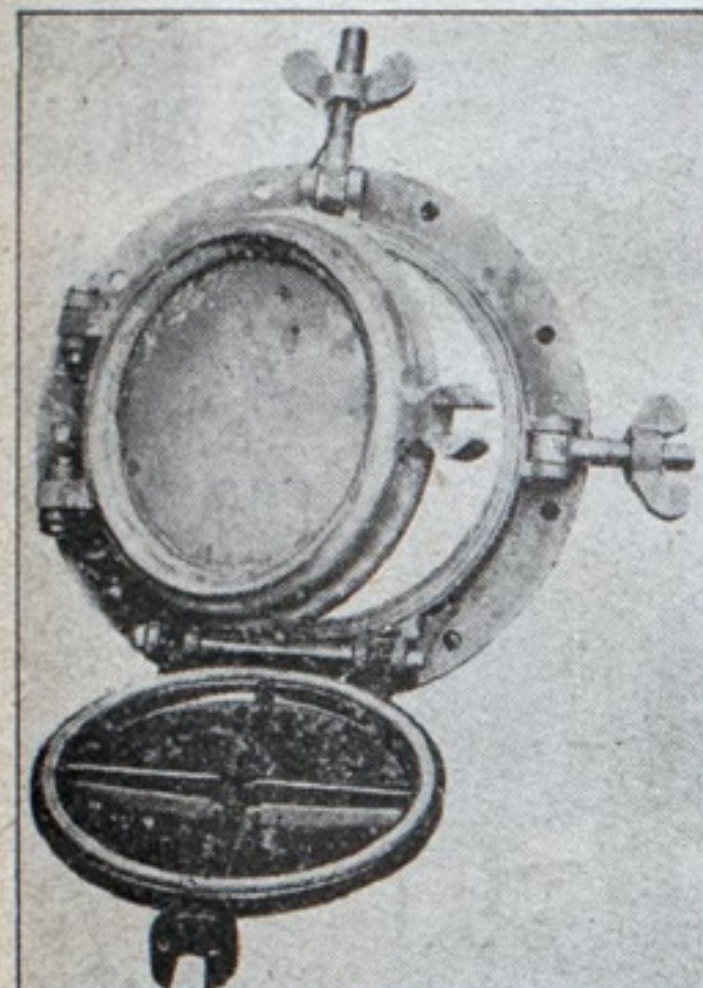
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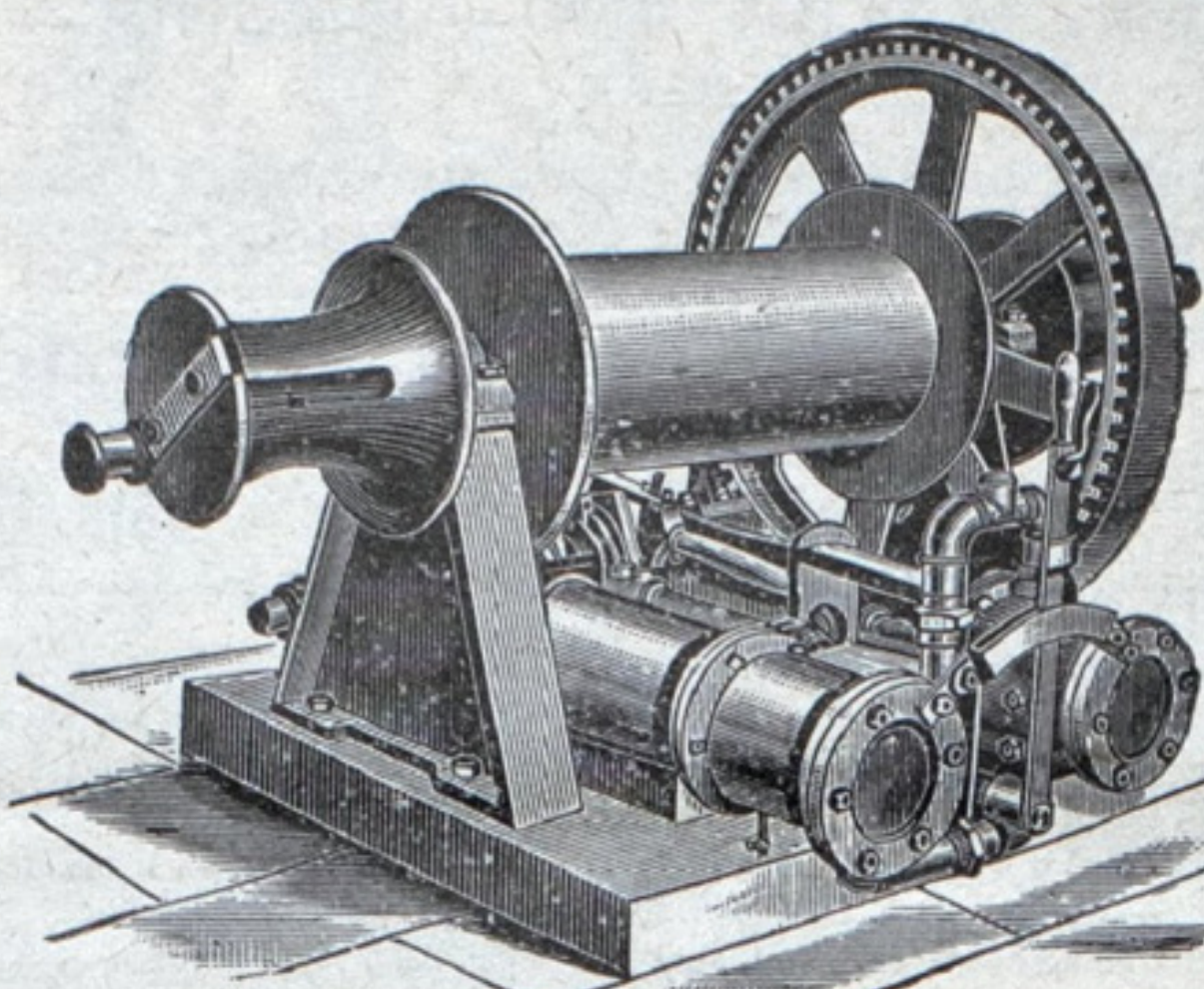
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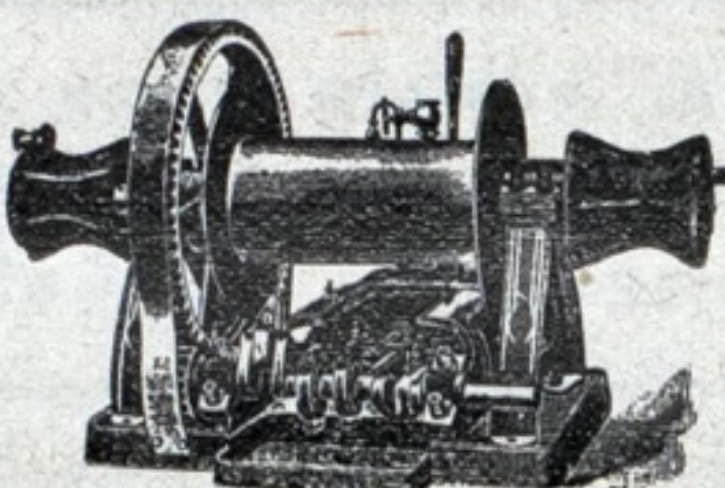
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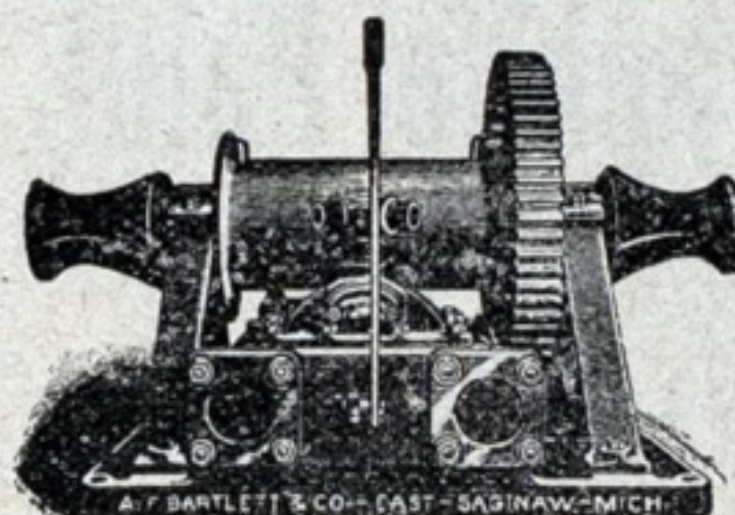
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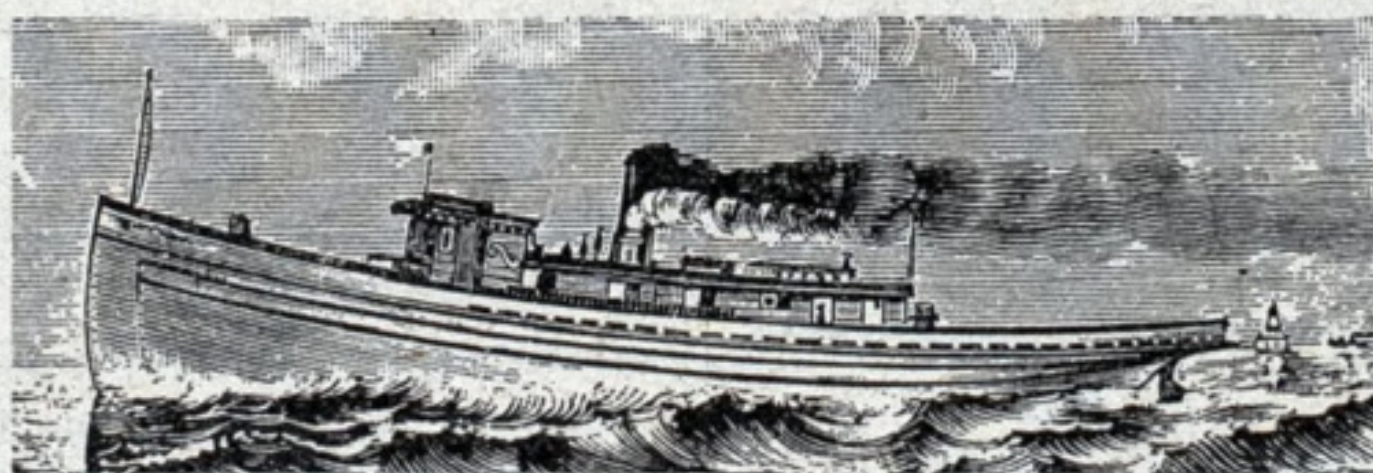
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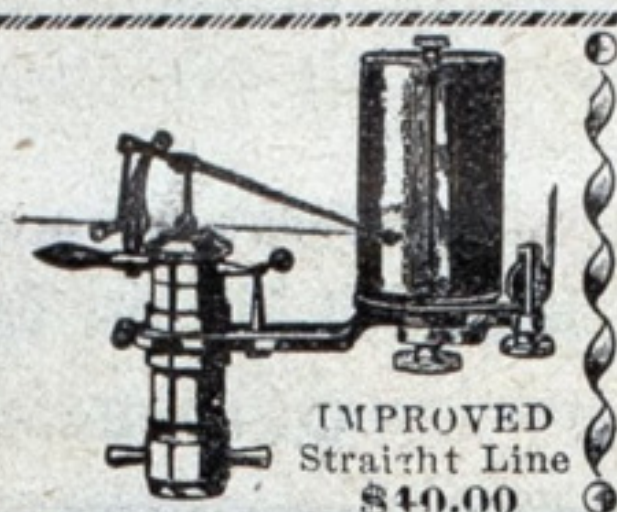


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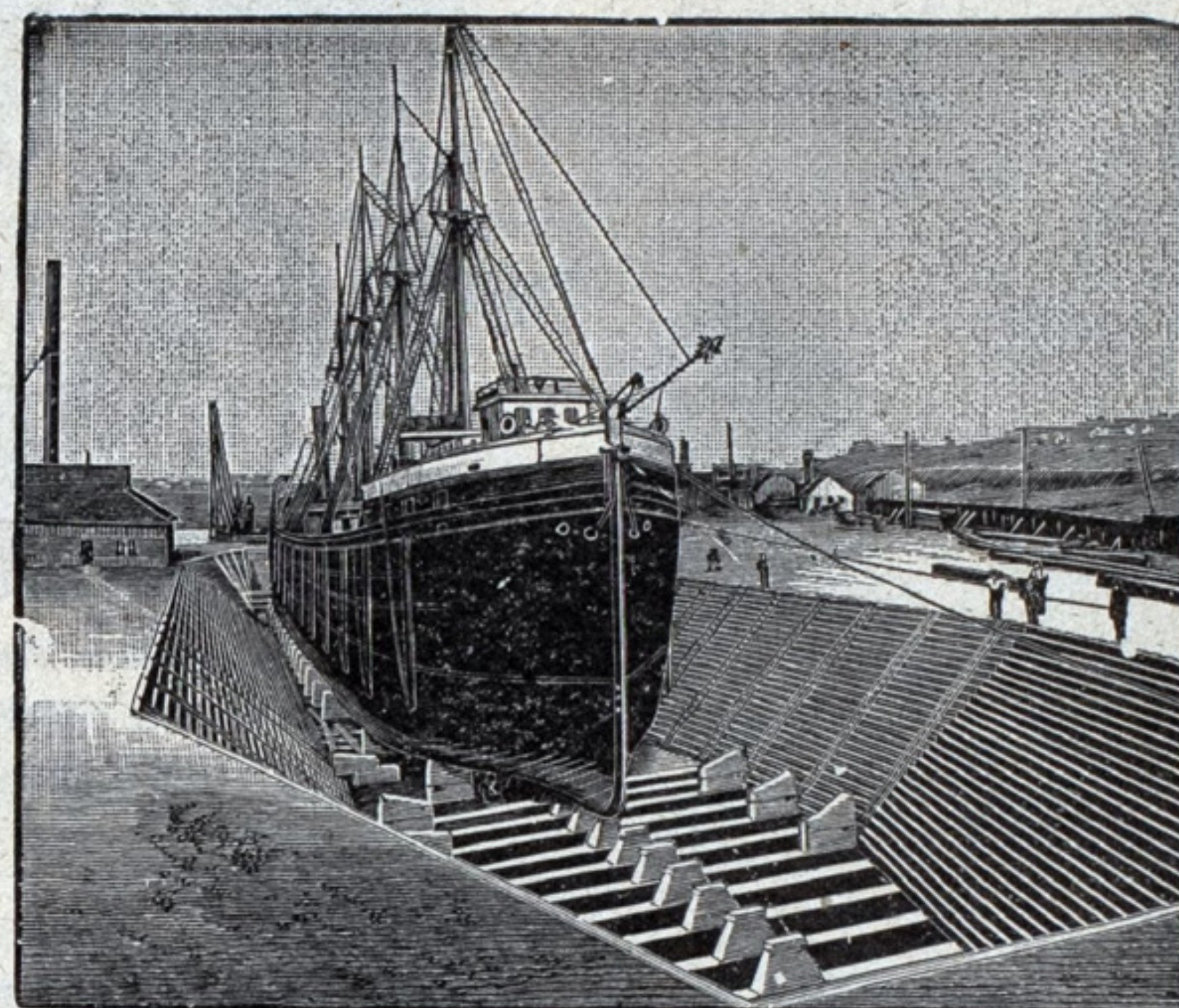
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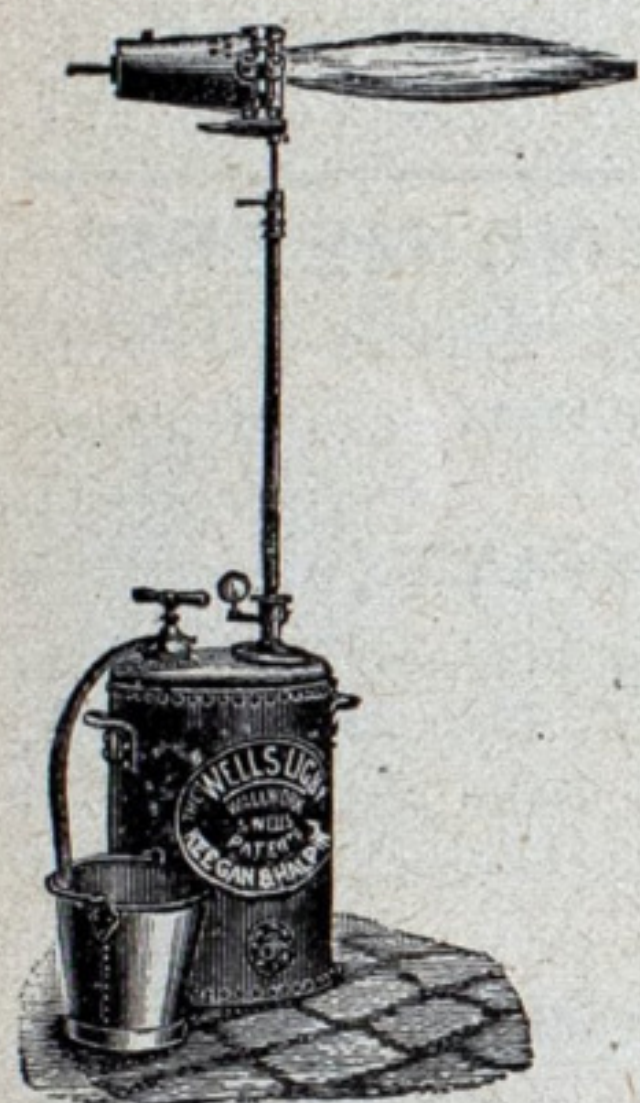


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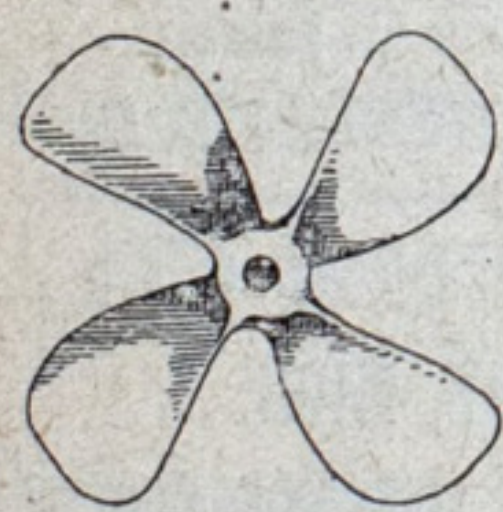
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